SEQUENCE LISTING

<110> COSTA e SILVA, OSWALDO DA
BOHNERT, HANS J.
THIELEN, NOCHA VAN
CHEN, ROUYING
SARRIA-MILLAN, RODRIGO

<120> PROTEIN KINASE STRESS-RELATED PROTEINS AND METHODS OF USE IN PLANTS

<130> 16313-0032

<140> 09/828,313
<141> 2001-04-06

<150> 60/196,001
<151> 2000-04-07

<160> 128

<170> PatentIn Ver. 2.1

<210> 1
<211> 695
<212> DNA
<213> Physcomitrella patens

<220>
<221> modified_base
<222> (636)
<223> a, t, c, g, other or unknown

<220>
<221> modified_base
<222> (680)
<223> a, t, c, g, other or unknown

<400> 1
gcacgagctc aatcctcatg tttcggactg tggactagct gcccttgcac catctggttc 60
tgaacgccag gtgtcggcac aaatgttggg ctctttcggt tacagtgccc ctgagtacgc 120
catgtctgga acctataccg tgaagagtga cgtctacagc ttcggtgttg taatgctgga 180
gctactcact gggcgcaagc ctttagacag ctcaagacca cgatccgagc aatctttggt 240
acgatgggcc acacctcaat tgcacgacat cgacgccctt gcacgaatgg tggatccgtc 300
gttgaagggc atctaccctg ctaaatcact ctctcggttt gctgatatag tcgccctttg 360
cgtccagccg gagcccgagt tccgaccccc gatgtctgaa gtggtgcagg cacttgtaag 420
gctgatgcag cgtgcgagtc tgagcaaacg cagatcggag tccgctgttg ggaattgagt 480
cgaacgagcc atctgagact tcacctttga gagtactgaa gcgcccacta gcctaatcgt 540
gcatctttgg ccatctcgtt tctgagtgga acacaaagct gggtatattc tttggtggtt 600
aagcaaccat ttgtcccaat ttgaacttcc gctggngaag gtctgtatgt tgagaaacga 660
tgcaaagcgt tcgcgtggtn tgcttgaact tcaaa 695

<210> 2
<211> 512
<212> DNA
<213> Physcomitrella patens

<400> 2
ggcacgagcc gaacttcagc agcttcttca catcttcagg ttgcttggca ccccgaatga 60
gacaatctgg cctggtgtta gccagcaccg tgattggcac gagtttcctc aatggagacc 120
acaagatctg tcccttgctg ttcccggact cagcgcggtt ggcttagacc ttctcgccaa 180
aatgttggta ttcgagccct caaagagaat ctctgccaaa gccgccttga gccatactta 240
tttcgctgat gttgataaga cagcaaccta aacacaacag aacaattcaa gagaaccagg 300
taacctctac ctgtccaaga cgaaggacat ctaactcttc agtcaaactt ggccaatcat 360
gctgattggg aattgaacca caggaacgag gtgggcaccg tggttcgctg tagcatacaa 420
agtagtctgg aagacttgac atcgttagct ggcaatgcag tattttggaa atacaatttt 480
tcattaaaaa tctcctaaag attcaatatt tg 512

<210> 3
<211> 651
<212> DNA
<213> Physcomitrella patens

<220>
<221> modified_base
<222> (608)
<223> a, t, c, g, other or unknown

<400> 3
gcaccagact atgacaagcg cacgcccttg cacatcgccg cgtccctgga ttgtgtccct 60
gttgctaaag tcctgcttgc ggaaggagca gagttgaatg caaaagacag gtgggggaaa 120
tctccgagag gcgaggcgga gagtgcagga tacatggaga tggtaaagct gttgaaggat 180
tacggggctg agtcacacgc aggtgccccg aggggccacg ttgagagtct gattcaggtt 240
gcccctccgt tgccttctaa ccgcgactgg gagatcgctc cgtcggagat tgaacttgat 300
accagcgagc tcatcggcaa aggctccttt ggagagattc ggaaggcgct ttggcgcggc 360
acacccgtcg ctgtgaagac aatcagacct tctctgtcca acgacagaat ggtcatcaag 420
gacttccagc acgaggtgca attgctcgta aaggttcggc acccaaacat tgtgcagttc 480
ctcggggctg ttacccgtca aagacctctc atgttagtca ccgagtttct ggcaggggg 540
cgatttgcat cagttgctga ggagcaccct aaatttggct cctgaccgca tcgtgaagta 600
tgccctcnac atagctcgcg gcatgtctta cttcaccatc ggagcagccc a 651

<210> 4
<211> 710
<212> DNA
<213> Physcomitrella patens

<220>
<221> modified_base
<222> (54)
<223> a, t, c, g, other or unknown

<400> 4
tccagcccat ttggttggcc acacacagct gttcatgagt cacccgcttc aggntgaact 60
gaagaaacgt aactccgtac ggctatttta ccaaattttc aagctcgttg tcccgccatg 120
atccaaatgg aagctcagtt tgcaacatga agtacattga acacacctac cgcccaccag 180
tcagaagcca ggccatgacc ttgtccttga atgatctcgg gtgctaagaa atcagccatg 240
ccacagactg tgaaagtgcg ctcatccgac atttgctttg caaaccgaaa atcaaccagc 300
tgaagtcgtc ctttccgatc tatcataaga acatcgggag agatgccacg atatacaacg 360
ccatccttgt gcagaagttc gacggctaat accacgttgg cgaccagaaa acgagctgag 420
ttctcgtcta aaggtgaccg aagtagaagt tctagaggcc cagctaacac acaattaaga 480
acgagtgcca cattgtcact gtcaataggg gtggccaaga gatgcggcac gaatggggaa 540
ggcctcagtt gcttgaaaag agttctctcc aataggactt ggccctcccg accgagtctc 600
tgaactttac gtctctggta ccttttcatg cttatgacgt catctgattt cttgcagagc 660

accacaccga catcacagca atcggttgaa tagacctggt gccgattcct 710

<210> 5
<211> 1271
<212> DNA
<213> Physcomitrella patens

<220>
<221> modified_base
<222> (619)
<223> a, t, c, g, other or unknown

<400> 5
tatgcccatc ttctcatact cagaccagat cctctatttc aattacagaa gaaagttgct 60
tgtgcaacgt attgaaatca tcaccgtcat gggctttccg agtaaaaatt cttgtaatgg 120
ataaagtcat ttctagtctg atccatacaa gctaccgaca caatgctaga agccttgatt 180
tacacactac acactagaga gtctacaact cttttcctac actctgctta gttgcctcat 240
cctcaactcc ataaaccccc attcacaatc atgtaagact tgagagaggg aaacagtaag 300
caaccttgtg ctattttagt accagagcag aggatgaacc actagtcctc ccaacgtaag 360
ccctaattcg ccgcaacaac ctcacgacgg aactccgact tggtcaaggg tggacaatat 420
gatacattcg aaggtcgatt ttgcaaatgg gacgaagcag cggaattctg gctgcgcact 480
gattgcagag agccattctg ggggagttga gtatacacag tccagtcgta cacatggtcg 540
agctggaatt ttttctgaat gaaaagatca cggaacaagc ttcggaggta cagtagtcag 600
gctgctcgta aaaacctana cttcgcggcg tggtgcaaaa agtcggcaaa ttgactggga 660
tacccatcac aaagctcctc ccacagtggg ggtcatcttg attttgttgt gcatgtactc 720
gtgttgcttc tggtcagtga gggcgttgcc cgcccttccc ttgccatggc aaattgcctc 780
ttagaaagta cataagaatg taacccaagt gattctatgt catctcttct actgtgctcg 840
attcctctgt gctgattcct actagcgtac cgtgccgtcc ctgtgaagct cttcctatct 900
cggtaaggga tatgccttcg tgttgccggg tccatgtact cctttgccaa gccaaaatct 960
ataatgaaca cttggtttcc ttgccgaccg cagcccatga ggaagttatc cggcttcagg 1020
tcacggtgaa cgagccctcg agaatgcacg tattccaccc ggtcaatcat ttggtaaccg 1080
agcataatca cggtcttcaa cgaaaacctt agcccacaca ccttaaagag gtgcaacagg 1140
ttcggcccca ataggtctag caccatcaca ttgtagtctt ctgctgcttt tccgaaccat 1200
ctcatgttgg gcactccctt cccaccccgc aatatgttgt acaagcgcga ctcgtgcatt 1260
aactctcgtg c 1271

<210> 6
<211> 1910
<212> DNA
<213> Physcomitrella patens

<400> 6
ttttttttt ccaatagatt tgcattacat aactccaagt tatgatatgt acaggttagc 60
aacaagctaa tggctgcaag cagtgaacat actaccaagg gagagattct cactccctag 120
acttcatcct cgtacgttac ttggcaagga ttatggttta gtgataaaaa gcttcacaag 180
ccggcaagca tgctggttgc ttctgctgca atctaatgat tatttcctta ggaatcgtat 240
ggcagagagc taccacacaa agcactgaca atggtttgat ggtaacaaga tagagatcca 300
ttcattccta agtatgagag acctgtagtc ttagcaccat tgtaggacag aaccaccgtt 360
ttcccctcaa tcaggctgtt gccaaatgta gagcaactct catcaacata acaagagggt 420
ttgatagaag acagagcccg gctatataac cacaagccct gcgcctacct tataacggct 480
tggatccacc tcaacagaaa gtgattcaac tcccttgata ccggctttcg taaatcctca 540
agttggcaga tggcggttgt ggatggcggc tagatatccg ctttgggtcc gaagtaactg 600
gagagctcct ctgcatccct gctgacgacc gtaagctggt gggaccaagc ttactgctcc 660
ctgttcgaga ggaatctacg acttctgctg atgcccctga gggcctgctg ctagatagga 720
cagctcgcct ggaggaagaa ccccccgag ttgcatacga agatgtatgc atgcgctctg 780
gttctgacac aacagcaaga gcagaatcct tagcagattc atcaagtcca ggacttttgt 840

gcttagatga gtccaaagca tttgcgaccc cggagccatt tgctcctcca ggaagcctgc 900
gccgagaagg atccattggt tcggtgggcc gctgcaggtc tcggcttcct gtagccccag 960
ttccaagtgc accactggtt tgccctgcag aagcacccag tcgagttgaa ctgccaccgg 1020
aaatttgtga ctgctggtac ttcagaattg tccagtcaaa aacgtagtca aattgaaaac 1080
ctgtaaaact atttccagtt taggcaaaca gaagtggcac tgtaataaac tgaaaatcat 1140
caaacattca caaactatct gttcgttgat agagcatagt aaagtctgcg cttaggatca 1200
agtcttgata cattacaatg cccaagcaag agtgaaacct acaaaagtta cagttttcat 1260
accctcacga ataaagaggt cacggaagat tcttttcaaa tatgcatagt cgggtttgtc 1320
atcaaaacgc aaggaccggc agtagtggaa gtacgctcgt gcgaattctg aaggataatt 1380
tttacaaagg acctcaatgg gcgtggacat ttgttttctc actgatcttc tcgtacttct 1440
gcttcttggt tcccgctttc agtccttgcc catggaagac tgcctctcag gaagtacatg 1500
agcacatatc caagagattc caaatcatct cgtctgcttt gctcaatacc aagatgagtg 1560
ttgatgcttg cataccgagc agtccctgtc agatttttgt tctccctgta gggaatatgc 1620
tgatgcgtgg aagggtcgcg gtacttcttg gcaagaccaa aatcaataat gtagacctgg 1680
tttgctcgcc taccaagccc cattagaaaa ttatcaggct tgatgtctct atgaagaaag 1740
cttttcgcat gcacatactc cactctgttg atcagctggt cagcaagcat gagaacagtc 1800
tttaaagaga acttccggct gcagaagttg aaaaggtctt cgagacttgg ccccaacaga 1860
tccagaacca agacattgta gtctccttct atcccgaacc atcctcgtgc 1910

<210> 7
<211> 720
<212> DNA
<213> Physcomitrella patens

<220>
<221> modified_base
<222> (58)
<223> a, t, c, g, other or unknown

<220>
<221> modified_base
<222> (612)
<223> a, t, c, g, other or unknown

<400> 7
cggtggggcg ctccccaata ttttatcccc ggggctgcag ggaatccggc gaccagtntt 60
tgaaggtgtc aacgccgtga atagtgagcg ttgcgttatg aagattttga agccagtaaa 120
gaaaaaaaag atcaaaagag agatcaagat tctgcaaaac ctttgtggag ggcccaacat 180
tgtgaagctt ctggacattg tccgtgatca gcaatcgaag acacccagcc taatttttga 240
gtatgtgaac aatactgatt tcaaagtgct ctaccccact cttacagact ttgatatccg 300
atactacatt catgagctgc tcaaggcttt ggactattgc cattctcaag ggattatgca 360
cagggatgtg aagccacaca acgtgatgat tgaccatgag cagcggaagc ttaggcttat 420
tgactgggga cttgccgaat tctatcatcc tggcaaagag tataatgtgc gtgttgcctc 480
taggtacttc aagggtcctg agctgctggt tgatcttcaa gattatgatt actctctcga 540
catgtggagc tctggggtgc atgtttgccg gcatgatatt tcggaaggag ccattctttt 600
atgggcatga canttcatga tcaacttggt gaagatcgct aaggtgttgg gaacttgatg 660
aattgaattc ctatctaaca aataccgcta agtggacccc attggagcac ctggtggggg 720

<210> 8
<211> 953
<212> DNA
<213> Physcomitrella patens

<400> 8
gcacgaggaa ctaacgaatt gtcattctat aatccaatag tgtaatcaca cgggggggaa 60
taagttgcaa aaccatacaa cgccgggata gcgttgtagc cacctaaaga attgagagta 120

ggccttacaa cttgagatga agtgtgaagt ggtactgcac catatcatca ggacctaagc 180
tgcaatccag agcctccctc caaatgagat ccctgatagg ctcctccgag atagagggct 240
cctcgaagcc aaactcgaag ggagataccg agccaggctc atcgttgatg tcatgaagtg 300
aagcttaaat aagggtgcgc caaggcagct tccactgtga ttcttttcgc tggatcaaag 360
accagcatct tttcaacaag atcaagagca gaacgattaa tgcctctgaa cttctgggtt 420
aagggaatag gcgactgtcg aggcaggtgc ttgatatacc gcctagcatt gtcgcttctc 480
aaaaacccaa gatccctatc ttcaggagtt ccgatgagtt ctgtaattag gcggagctga 540
tgcacatagt ctctcccagg gaacaacgca gatcggttaa gcaactccat gaagatgcac 600
cccacagacc aaatgtcaat agctgcagtg tatgctgaac aattcaggag cagctctgga 660
gctctgtacc acctcgttac aacatactca gtcatgaaat ccgtttcaga gagagtgcgt 720
gccaagccaa aatctgcgat tttcaaatcg caattggcat tgacgagaag gttggtgggc 780
ttcaagtccc ggtgcaagac gttcgccgaa tggatgtact tcaagccccg caagatttga 840
tacagaaaat actgacagtg gtcttctgtg agagcttgat ttgaacgaat gatctggtgt 900
aggtccgtat ccatcaactc gtatacaatg tacacgtcgt tgaaatctcg tgc 953

<210> 9
<211> 683
<212> DNA
<213> Physcomitrella patens

<220>
<221> modified_base
<222> (603)
<223> a, t, c, g, other or unknown

<220>
<221> modified_base
<222> (610)
<223> a, t, c, g, other or unknown

<400> 9
cggcaccagc ctcgctggag accgaccatc gaagcacctt aagctcgttt tcattcggca 60
ttgcttgcga gcacttcgac ttcctagaat ttcaatagac ctaatggaat cgccactccc 120
taatctttcc ggagaggcct tatcgccgac ggcaactgcc gaagacgaga ttactcagat 180
gatactaaaa agtgccgcaa ggtccgaatt aggaatgtat gtttcgaaga gacaggaatt 240
ctatcttcga agagcgcgga ggcggcgtaa gtttgcgtgg aagccggttt tgcagagcat 300
ctccgagatg aagcctgtca tggaattcca cactccgatg gcttaccggg atagtgggtc 360
tccgccgaag aacgcctcta ccccatcctt acctggcccg aagaacattt caccgccacg 420
acaagtgagt gtcccgcaaa ggagcagtcc tccgccgaag aacgtctcac cacctcccca 480
gcccggcatt ttgtagcgcg gactgcgatc gaagtattct gctgcatctc agcaagttca 540
acgaaatcga gggcaacgcg aaatctcttt tatatggcgt agtttgtgtc tccgactgga 600
ctcctatcta tccccatcga gataactgat tcggtggata atttctccaa attttggcta 660
acncaagaan ctcaagggcg aat 683

<210> 10
<211> 1156
<212> DNA
<213> Physcomitrella patens

<220>
<221> modified_base
<222> (923)
<223> a, t, c, g, other or unknown

<220>
<221> modified_base

<222> (1143)
<223> a, t, c, g, other or unknown

<400> 10
gcacgaggtt ggtgtaagtt attgatagtg ctgtgcaatt cacagttttg ctactccggt 60
aggtccgacc tcttcaattg tcagtttaaa aactctaaaa acatttgaga aaagtgttga 120
aaaatctccg tgaggaaatt ccttgtcgca agacgtgaaa aaaagaagaa agaagatgga 180
aatattgttt tgggtatcga agaagtgttc gatgctgtgc aataaggaaa gaaaaagtgc 240
aggtaacata aaaagctagc atggtgatga taatataaga ccccgattaa cacacttatg 300
gattgtttca tgagctgcac gttctcagcg acaaatgggg ctcattgaga aaactccact 360
ttctataagg ttgggaaacg agcgtttttt ttttgaagat gtttttttccg tcaatctgat 420
ttgatatcgt tctcaacttg accacatatg actatataag gaaaaggcat tgagaaagtg 480
gcggattggc gaggtagttc gaccatgctt ttggtaaagt cccttgaagt tcagtggtgg 540
atcaggcttg tggtagtgac agtctctgca cgccatgcga ggctaacttt aagttacaaa 600
atcttgctca aatggtactc ttcctcgttg tacttttgca ggaacggatg tttaagtaaa 660
tcagtagttg atggtcgttc actgggacat ttccggatgc aggattcaat aaaagaacaa 720
aattcggggg agaatttgtc aggggatgcg gctgcggggg gttgattaac tatacattcc 780
atgaggatga agaaattttg ccaaccctct tccattccag ctggtttgta tgggaaggta 840
cccaacgcac actccaaaag agtcaatcct aaactccata ggtcactgtc gtatgcatac 900
gaacgcccct gaaggcgttc tgncgacata tatgtgcaag tcccaacgaa cgtgtctcgc 960
tgggccaagg aatgaaccaa cacagcactg acaccaaaat cagatatttt gacctcaccc 1020
ttgtgattga tgaggaggtt ggagggcttt atatcacgat gtatgatgtg cctgacttgg 1080
tgtaggtatt ccaatccctt cagaacttga ctagcaatga cggccaaata cggctcaggt 1140
atntgctttc tggtgc 1156

<210> 11
<211> 629
<212> DNA
<213> Physcomitrella patens

<400> 11
tccccgggct gaggaattcg gcacgagcgg ttgatcctca cccttgggaa ggaccctgga 60
attgagtagc gtgcggaagc tgcatcgatc cggaagagac gatgagtagg agagtgagaa 120
ggggaggtct tcgcgtcgcg gtgccgaagc aagagactcc cgtcagcaaa tttttgactg 180
ccagtggaac tttccaggat gatgatatca agctcaacca caccgggctt cgcgtcgtct 240
cttcagaacc taaccttcct acgcagacgc agtctagctc cccagatggg caactgtcaa 300
tagcagacct ggagttagtg cggttcttag gaaagggtgc gggtggaacc ggtgcagctt 360
ggtccggcac aaatggacca atgtcaatta tgcactgaag gcgatacaaa tgaatatcaa 420
cgaaacagtg aggaagcaga ttgttcagga gctgaaaatc aaccaagtga cgcaccagca 480
gtgcccttat atcgtggaat gcttccactc cttctaccac aacggcgtca tatccatgat 540
cctagagtac atggacaggg gctcgttgtc cgacattatt aagcaacaaa agcagatacc 600
tgagccgtat ttggccgtca ttgctagtc 629

<210> 12
<211> 514
<212> DNA
<213> Physcomitrella patens

<400> 12
gcaccagccg agtcgggcat ttttcgtgcg gtgttgaggg ctgacccgag ctttgaagaa 60
gccccttggc cttccatctc tcccgaagcc aaggatttcg tgaagcgtct cctgaataag 120
gatatgcgga aacgcatgac tgctgcacaa gctttaactc atccatggat tcgaagtaac 180
aacgtgaaga tacctctgga tatcttagtg tacagacttg tgaggaatta tcttcgtgca 240
tcatccatga gaaaggctgc tttgaaggcc ctgtcaaaga ctttaaccga agacgagact 300
ttttatctac gtactcaatt tatgctgcta gaaccaagta acaacggtcg tgttactttt 360
gagaatttca gacaggcact gctgaaaaat tcaacagagg ccatgaaaga gtcacgggtt 420

tttgaaattc tggaatcgat ggatggtctt catttcaaga aaatggactt ttcagagttc 480
tgtgcagcgg ccattagtgt tctccagtta gaag 514

<210> 13
<211> 1387
<212> DNA
<213> Physcomitrella patens

<220>
<221> modified_base
<222> (1385)
<223> a, t, c, g, other or unknown

<400> 13
gcacgagctc ctgcatctcc ccctccttct cctcctcatc attctggagc ccagcgaact 60
gcgatctgag attccaactt ggaagggcct cgcgtaagca ccggagctcg tttcttacgc 120
ttttgcgcct cgcgatattt gtacattgtt tcctctggtt ttattcgatt ccgcctctga 180
aaatgtgaac gggctgcaag cttggttttg gagcaacgtt ggagcattga agggttgcgc 240
tcgtccctgc ccattcctcg cttctgctct ggcctatgtc atgacgacgt gaaggagagg 300
atttgagggt tttgcaagtg atataatcct ccccgaggag atttctgtga gttgattaac 360
ttggatcagc gacatgggga acactagttc gaggggatcg aggaagtcca ctcggcaggt 420
gaatcaggga gtcgggtctc aagacacccg agagaagaat gatagcgtca atccaaagac 480
gagacagggt ggtagcgttg gcgcaaacaa ctatggcgga aagcacaagc agtggtgctc 540
aggccggaga acgatccacc tctgcgcccg ctgctctgcc gaggccgaag ccagcatcga 600
ggtcagtatc cggtgttttg ggtaagccgc tgtcagatat tcgtcaatct tacatcctgg 660
gacgggagct tggccgaggg cagttcggag tgacttactt gtgtactgac aagatgacga 720
atgaggcgta cgcgtgcaag agcatcgcca aacggaaact gaccagtaag gaggatatcg 780
aggatgttaa gcgggaggtt cagattatgc atcacctgtc ggggacaccc aatatcgtgg 840
tgttaaagga tgtgttcgag gacaagcatt ccgtgcatct tgtgatggag ctctgtgcag 900
gtggcgagct cttcgatcgc atcattgcca aggggcatta cagtgagcgc gccgctgccg 960
atatgtgcag agtcatcgtc aatgtggtgc acagatgcca ctcattaggg gtcttccatc 1020
gggatctcaa gccagagaat tttctgttgg ccagcaaggc tgaggatgcg cctctgaagg 1080
ccacagactt cggtctgtca actttcttta agccaggaga tgtgttccag gatattgttg 1140
gaagtgcgta ttacgtggcc cctgaagttt tgaagagaag ttatggtcct gagctgatgt 1200
ttggagtgca ggcgtgattg tgtacattct gctgtgtggt gtacccccct tctgggctga 1260
aactgagcag ggtatctttg acgctgtgct caaagggcac atagacttcg agaacgagtc 1320
catggccgaa aatctccaac ggggctaagg atttggtgag gaaaatgcta aaccctaacg 1380
tgaanat 1387

<210> 14
<211> 2784
<212> DNA
<213> Physcomitrella patens

<400> 14
atcccgggtg agtatcactt acggtggcga gggatggcct ttggggtagg agctggtata 60
tgcggagtcc aacagaagct tgtgcaggac tcttgagttg tgcgtgcgag ggctgagtgc 120
cggaaaggta ttttccgacg aagagtcaat gtgggcgtgg acaaacgttt gaagagatgg 180
gtgtggatat gaaggctccg gctaagcagt cgctgggagt cggactgctc ctgtgctctg 240
tagtgatcct ctcggtggtg agctctgtgt atggccaagt tcagacagat ccagtggata 300
ctacaggctt aatttccatg tggtatgact taaaacagag tcaatctctc acggggtgga 360
ctcaaaatgc ttctaaccct tgtgggcagc agtggtacgg cgttgtatgt gatggctctt 420
ctgtcacgga aatcaaaatt ggaagtcggg gtttgaatgg aaattttaat ccttcgtact 480
ttcaaaacgc ttttaaaaag cttcgaattt ttgatgctag taacaacaac atcgaaggaa 540
atattcctca acagtttcct acgtctctta ctcaaatgat attgaacaac aataaattga 600
ccggaggtct cccacagttt gatcaattgg gcgccttgac agtcgtaaac ttgagcaaca 660

acaatctgac cggcaacatg aaccccaact atttcaatgt gatcgtgaat gtggaaacct 720
tcgatgtttc ctataaccaa cttgaaggca ctcttcccga ctccattcta aacctggcca 780
agcttcgttt cttgaatttg cagaacaata aatttaatgg taaacttccc gacgatttct 840
ctcggctgaa gaatttgcag actttcaaca ttgagaacga tcagttcacg ggtaattatc 900
catcaggttt acccagtaat agcagggttg gaggaaatcg tcttacattt cccccacctc 960
cagcccccgg cacacctgct cccaggactc cttctccttc aggaacatcg aatggatcat 1020
cgtcgcatct ccctctaggg gcgatcattg gaatagccgc tggtggtgct gtgctgcttt 1080
tattactagc actcggcatc tgtttgtgtt gtcgtaagcg gtccaagaaa gcattgggcg 1140
atccagaggc cacgaccagc agccgaagac cgtggttcac acctcccctc tccgcaaaga 1200
gccagagtga tcccagcaag agcatagaca aaacgacgaa acgcaacatc tttggcagca 1260
gtaagagtga gaagaaaagt tcaaagcaca gagtatttga gccagctcct cttgacaaag 1320
gagcagccga cgaaccagtg gtgaaggcgt ctccgcccgt caaggtactg aaggctcctc 1380
cttcatttaa gggtatcagc ggcctgggtg ctggacattc gaaagcaaca attggcaagg 1440
tgaacaagag caatattgca gccaccccat tctctgtagc ggatcttcag gcagccacaa 1500
acagcttctc ccaggataat ctgattggag aagggagcat gggtcgcgtg tatcgtgccg 1560
agtttcccaa cggccaggtc ttggccgtga agaagatcga cagcagcgcg tcgatggtgc 1620
agaatgagga tgacttcttg agtgtagtag acagtttggc tcgcctgcag catgctaata 1680
cggctgagct tgtgggttac tgtattgaac atgaccaacg gctgttggtg tacgagtacg 1740
tgagtcgtgg aaccctgaac gaattgctcc atttctcggg tgaaaacacc aaggccctgt 1800
cctggaatgt ccgcattaag attgctttgg gatccgcgcg tgctctggag tacttgcacg 1860
aagtctgtgc acctcccgtg gttcaccaca acttcaaatc tgccaatatt ctgctagacg 1920
atgagctcaa tcctcatgtt tcggactgtg gactagctgc ccttgcacca tctggttctg 1980
aacgccaggt gtcggcacaa atgttgggct ctttcggtta cagtgcccct gagtacgcca 2040
tgtctggaac ctataccgtg aagagtgacg tctacagctt cggtgttgta atgctggagc 2100
tactcactgg gcgcaagtct ttagacagct caagaccacg atccgagcaa tctttggtac 2160
gatgggccac acctcaattg cacgacatcg acgcccttgc acgaatggtg gatccgtcgt 2220
tgaagggcat ctaccctgct aaatcactct ctcggtttgc tgatatagtc gccctttgcg 2280
tccagccgga gcccgagttc cgacccccga tgtctgaagt ggtgcaggca cttgtaaggc 2340
tgatgcagcg tgcgagtctg agcaaacgca gatcggagtc cgctgttgga attgagtcga 2400
acgagccatc tgagacttca ctttgagagt actgaagcgc ccactagcct aatcgtgcat 2460
ctttggccat ctcgtttctg agtggaacac aagctgggta tattctttgg tggttaagca 2520
acattttgtc acaatttgaa cttcagctgg agaagggtct gtagtgttga agaaaacgaa 2580
tgcaaagcgt ttcggcgtgg atgtgctttg agaacttaca aaactcatca agactttgaa 2640
gatctttgta ttgcatcgaa tcctttcaat cagtctcggg taggatcagt tcctctgtat 2700
cggataccct tttcatccta acatgggacc cttttaatcc agaggatgga gtgcttggaa 2760
tagtgacctt ggtcgagtta acgc 2784

<210> 15
<211> 1088
<212> DNA
<213> Physcomitrella patens

<400> 15
atcccgggag tgggtggttg gactgtaagg agctagcgtt ttagagctac agtgcggttt 60
gctgtgtgag tgagtgagtg agtgagtgcg tgagtgagga tgtctgtttc tggtatggac 120
aactatgaga agctggagaa ggtaggagag gggacttacg gaaaggtgta taaggcccgt 180
gataaacgct ccgggcagct ggtggcgctc aagaagacta ggttggagat ggaggaagaa 240
ggcgtccctt ccaccgcttt gcgcgaagtt tcgttgctac aaatgctctc ccacagcatg 300
tatatcgtca ggctactttg cgtggagcac gtcgagaaag gcagcaagcc catgctctac 360
ttggtctttg aatatatgga cactgatctt aagaagtata ttgacttgca cggtcgtggt 420
ccgagcggga agcctctgcc tcccaaagtg gtccagagtt tcatgtatca attgtgcaca 480
gggcttgccc actgtcatgg ccacggagta atgcacaggg atctgaaacc ccagaatttg 540
ctcgtcgaca agcaaacccg tcgtcttaag attgccgacc ttggtctcgg tcgggcattc 600
acagtgccaa tgaagagtta cacacacgag attgttactc tatggtaccg agctcctgaa 660
gttcttcttg gagcgaccca ctactctcta cctgtggata tctggtctgt tgggtgcatc 720
ttcgctgaac tcgtccggaa aatgccgctc ttcactggag actccgaact tcagcagctt 780
cttcacatct tcaggttgct tggcaccccg aatgagacaa tctggcctgg tgttagccag 840

caccgtgatt ggcacgagtt tcctcaatgg agaccacaag atctgtccct tgctgttccc 900
ggactcagcg cggttggctt agaccttctc gccaaaatgt tggtattcga gccctcaaag 960
agaatctctg ccaaagccgc cttgagccat acttatttcg ctgatgttga taagacagca 1020
acctaaacac aacagaacaa ttcaagagaa ccaggtaacc tctacctgtc caagacgaag 1080
gttaacgc 1088

<210> 16
<211> 1627
<212> DNA
<213> Physcomitrella patens

<400> 16
atcccgggca acgagaagca ttcgagatgg cagatgcgaa ggaggaactg gcgctgcgca 60
cggaaatgca ctgggctgtg aggagtaacg acgtggggct gttaaggacc attctgaaga 120
aagacaagca gctcgtgaat gctgcggact atgacaagcg cacgcccttg cacatcgccg 180
cgtccctgga ttgtgtccct gttgctaaag tcctgcttgc ggaaggagca gagttgaatg 240
caaaagacag gtgggggaaa tctccgagag gcgaggcgga gagtgcagga tacatggaga 300
tggtaaagct gttgaaggat tacggggctg agtcacacgc aggtgccccg aggggccacg 360
ttgagagtct gattcaggtt gcccctccgt tgccttctaa ccgcgactgg gagatcgctc 420
cgtcggagat tgaacttgat accagcgagc tcatcggcaa aggcgccttt ggagagattc 480
ggaaggcgct ttggcgcggc acacccgtcg ctgtgaagac aatcagacct tctctgtcca 540
acgacagaat ggtcatcaag gacttccagc acgaggtgca attgctcgta aaggttcggc 600
acccaaacat tgtgcagttc ctcggggctg ttacccgtca aagacctctc atgttagtca 660
ccgagtttct ggcagggggc gatttgcatc agttgctgag gagcaaccct aatttggctc 720
ctgaccgcat cgtgaagtat gccctcgaca tagctcgcgg catgtcttac cttcacaatc 780
ggagcaagcc catcatccac cgcgatctca aaccccgaaa catcatagtg gacgaagagc 840
atgagctgaa ggtcggcgac ttcggactga gcaagctgat cgacgtaaag cttatgcatg 900
atgtgtacaa gatgacgggg gggactggga gttacagata catggcgcct gaggtcttcg 960
aacatcaacc ctacgacaaa tccgtcgacg tgttttcctt tggaatgata ttatatgaga 1020
tgtttgaagg cgtcgctccg tttgaggaca aggatgcata cgacgctgcc acactagttg 1080
ctagagacga taagcggcca gagatgagag cccaaacgta tcccccacaa atgaaggcat 1140
tgatcgagga ttgctggtca ccgtataccc cgaagcgacc acctttcgtc gaaatcgtca 1200
aaaaactcga ggtaatgtat gaggattgct tattgagatt gcccaaagac cgtcgtcatc 1260
tccgcgacat cttgcatctt cgacgcaatc ctgcagactc gtgattgatc gggccaacct 1320
tcgagctgat caatctaagt agtcaatgcc ttactgtgtc aaattcagcc tccgccgaca 1380
gattggctat ggttcaagtg attggattct ctgcttctcc agagccagaa acgacccccg 1440
tgcaatttct tctccgacga ccacattgcg acatgaagca ccagactttg gatgtagaag 1500
gcatggtcta catgctttgc tgtgagcctt gcacgtctcg caggttgatc tctttaacca 1560
gcttctagcc tttcgcaatg gctgcatcac ttaagaaatc accgagtatc gtgatgctcg 1620
ttaacgc 1627

<210> 17
<211> 1441
<212> DNA
<213> Physcomitrella patens

<400> 17
atcccgggct gtgatgtcgg tgtggtgctc tgcaagaaat cagatgacgt cataagcatg 60
aaaaggtacc agagacgtaa agttcagaga ctcggtcggg agggccaagt cctattggag 120
agaactcttt tcaagcaact gaggccttcc ccattcgtgc cgcatctctt ggccacccct 180
attgacagtg acaatgtggc actcgttctt aattgtgtgt tagctgggcc tctagaactt 240
ctacttcggt caccttaga cgagaactca gctcgttttc tggtcgccaa cgtggtatta 300
gccgtcgaac ttctgcacaa ggatggcgtt gtatatcgtg gcatctctcc cgatgttctt 360
atgatagatc ggaaaggacg acttcagctg gttgattttc ggtttgcaaa gcaaatgtcg 420
gatgagcgca ctttcacagt ctgtggcatg gctgatttct tagcacccga gatcattcaa 480
ggacaaggtc atggcctggc ttctgactgg tgggcggtag gtgtgttaat gtacttcatg 540

ttgcaaactg agcttccatt tggatcatgg cgggacaacg agcttgaaat ttttggtaga 600
atagcccgtc ggcagcttac gtttccttca agtttcagcc ctgaagcggt tgacctcatt 660
gacaagctgc tggtggtgga cccaaccaag agactgggct gtgacagcca tggatcgctt 720
gccataaggg aacatccttg gttccgaggt ataaactggg acaagcacct cgattgcagt 780
gtggaagttc cttcagagat catgacacgc cttcagttgg ccatagactt tcttcccgtg 840
gatgatagtt atcaagtgtt tgatctccaa cccgatgaag acgatccacc atggcttgat 900
ggctggtgat agcttgatgg ctcgtagatc ccccttctcc aagcatcaat ggcacagtac 960
cgaatggcta taacagaaga tgcacattaa gtgctccatg aacagatacc gtagcgctta 1020
ggatttttcg gtcgtcacaa atgacggctc tcttgtgagg ttcgaatgtt gtgtcacccg 1080
atgatctcta ctggcacaaa cctccaggct gaatcttaag gccagctgtt ttaggtgaga 1140
cgtttacctt ggttcgaact cacgctcgtg ttgttaagcg cgagtcgatg atgtatgaaa 1200
tgacggtgtt ccttgaaagt cttgaaaggc aatcaattcg cttatgtgtg tcccttccat 1260
gtggtcatta gggaagggaa ccgctgcact agtcagtaaa cgaacatggc ttcaattgta 1320
tagcatagcg gtagaggttt cgtacgaaat gtggttgcag tcggtgatta taggcgcatt 1380
tctctgaaca tgcacgagaa tcgtgctcct gagtctccat cattcagtgg tgcgagctcg 1440
c 1441

<210> 18
<211> 1736
<212> DNA
<213> Physcomitrella patens

<400> 18
atcccgggct cacgtagtgc actgaactct gtctgaattt taggggatga gaggtagatt 60
tgaagaatac tggtgtctaa ttttctgtta atttttcacc cttgaggtag ctcatggatt 120
tgggaggtga tcgcatgaga gctcctcaga ggcagtctcg agaatatcaa tatagatcat 180
tggacgtctt cacagagcag cacgagcagt tgcaaaagca gcagcagcaa gatgagtatc 240
agagaacaga attgaagctc gagacactgc caaaaatgtt aagcaatgcg accgtgtcat 300
cttcccctcg aagcagtccg gatggacgta gactacgtac agtcgcgaat aagtatgctg 360
tggaaggtat ggttgggagt ggcgcattct gcaaggtgta tcagggctcc gatttgacga 420
accacgaggt tgtgggcatc aagctggagg atacgagaac tgagcacgct cagttaatgc 480
acgagtcgcg cttgtacaac atattgcggg gtgggaaggg agtgcccaac atgagatggt 540
tcggaaaaga gcaagactac aatgtgatgg tgctagacct attggggccg aacctgttgc 600
acctctttaa ggtgtgtggg ctaaggtttt cgttgaagac cgtgattatg ctcggttacc 660
aaatgattga ccgggtggaa tacgtgcatt ctcgagggct cgttcaccgt gacctgaagc 720
cggataactt cctcatgggc tgcggtcggc aaggaaacca agtgttcatt atagattttg 780
gcttggcaaa ggagtacatg gacccggcaa cacgaaggca tatcccttac cgagatagga 840
agagcttcac agggacggca cggtacgcta gtaggaatca gcacagagga atcgagcaca 900
gtagaagaga tgacatagaa tcacttggtt acattcttat gtactttcta agaggcaatt 960
tgccatggca agggaagggc gggcaacgcc tcactgacca gaagcaacac gagtacatgc 1020
acaacaaaat caagatgaac accactgtgg aggagctttg tgatgggtat cccagtcaat 1080
ttgccgactt tttgcaccac gcgcgaagtc taggtttcta cgagcagcct gactactgtt 1140
acctccgaag cttgttccgt gatcttttca ttcagaaaaa attccagctc gaccatgtgt 1200
acgactggac tgtgtatact caactccccc agaatggctc tctgcaatca gtgcgcagcc 1260
agaattccgc tgcttcgtcc catttgcaaa atcgaccttc gaatgtatca tattgtccac 1320
ccttgaccaa gtcggagttc cgtcgtgagg ttgttgcggc gaattagggc ttacgttggg 1380
aggactagtg gttcatcctc tgctctggta ctaaaatagc acaaggttgc ttactgtttc 1440
cctctctcaa gtcttacatg attgtgaatg ggggtttatg gagttgagga tgaggcaact 1500
aagcagagtg taggaaaaga gttgtagact ctctagtgtg tagtgtgtaa atcaaggctt 1560
ctagcattgt gtcggtagct tgtatggatc agactagaaa tgactttatc cattacaaga 1620
atttttactc ggaaagccca tgacggtgat gatttcaata cgttgcacaa gcaactttct 1680
tctgtaattg aaatagagga tctggtctga gtatgagaag atgggcatgt taacgc 1736

<210> 19
<211> 1900
<212> DNA

<213> Physcomitrella patens

<400> 19
atcccgggtt gtcgaggacg gagagagaag agagagagag agagagagag aggtgttgtt 60
taggggaggc atgcgggagc aggattggtg ttaagttcgt aaggagaagg gagtacatgc 120
aagtgcgtgc ttgtcggata tcggacagct ggatttgtaa ataagcggag aggagggtcg 180
gtaatcaggg gcgtacatcg atggagccgc gtgtgggaaa caagtatcgg ctgggacgga 240
aaattgggag cggttccttt ggggagatct atcttgggac caatgttcag accaatgagg 300
aggtcggaat aaagctggaa agcatcaaga cgaagcatcc acaattgctg tacgagtcca 360
agctctaccg gatactacaa ggaggaactg ggattcccaa tatcagatgg ttcgggatag 420
aaggagacta caatgtcttg gttctggatc tgttggggcc aagtctcgaa gacctttca 480
acttctgcag ccggaagttc tctttaaaga ctgttctcat gcttgctgac cagctgatca 540
acagagtgga gtatgtgcat gcgaaaagct ttcttcatag agacatcaag cctgataatt 600
ttctaatggg gcttggtagg cgagcaaacc aggtctacat tattgatttt ggtcttgcca 660
agaagtaccg cgacccttcc acgcatcagc atattcccta cagggagaac aaaaatctga 720
cagggactgc tcggtatgca agcatcaaca ctcatcttgg tattgagcaa agcagacgag 780
atgatttgga atctcttgga tatgtgctca tgtacttcct gagaggcagt cttccatggc 840
aaggactgaa agcgggaacc aagaagcaga agtacgagaa gatcagtgag aaaaaaatgt 900
ccacgcccat tgaggtcctt tgtaaaaatt atccttcaga attcgcctcg tacttccact 960
actgccggtc cttgcgtttt gatgacaaac ccgactatgc atatttgaaa agaatcttcc 1020
gtgacctctt tattcgtgag ggttttcaat ttgactacgt ttttgactgg acaattctga 1080
agtaccagca gtcacaaatt tccggtggca gttcaactcg actgggtgct tctgcagggc 1140
aaaccagtgg tgcacttgga actggggcta caggaagccg agacctgcag cggcccaccg 1200
aaccaatgga tccttctcgg cgcaggcttc ctggaggagc aaatggctcc ggggtcgcaa 1260
atgctttgga ctcatctaag cacaaaagtc ctggacttga tgaatctgct aaggattctg 1320
ctcttgctgt tgtgtcagaa ccagagcgca tgcatacatc ttcgtatgca actcgggggg 1380
gttcttcctc caggcgagct gtcctatcta gcagcaggcc ctcaggggca tcagcagaag 1440
tcgtagattc ctctcgaaca gggagcagta agcttggtcc caccagctta cggtcgtcag 1500
cagggatgca gaggagctct ccagttactt cggacccaaa gcggatatct agccgccatc 1560
cacaaccgcc atctgccaac ttgaggattt acgaagccgc tatcaaggga gttgaatcac 1620
tttctgttga ggtggatcaa agccgttata agtaggccca ggcttgtggt tatatagccg 1680
ggctctgtct tctatcaaac cctcttgtta tgtagatgag agttgctcta catttggcaa 1740
cagcctgatt gaggggaaaa cggtggttct gtcctacaat ggtgctaaga ctacaggtct 1800
ctcatactta ggaatgaatg gatctctatc ttgttaccat caaaccattg tcagtgcttt 1860
gtgtggtagc tctctgccat acgattccta aggttaacgc 1900

<210> 20
<211> 1217
<212> DNA
<213> Physcomitrella patens

<400> 20
gcgttaacgg gaggaaggtc ggggaagag acgcttgagg ctgctgaaag gggattcact 60
cagcgtcccc acccattcgt caatctggcg cagaagatcg gaaaatcggt ccgacggcca 120
ggtgttatgt ccaaggcccg ggtttacaca gatgtgaatg tccaacgtcc gaaagattat 180
tgggactacg aggccctcac cgtccaatgg ggggaccaag acgattacga ggtagtgcgt 240
aaggtggggc gagggaaata cagtgaggtt tttgaaggtg tcaacgccgt gaatagtgag 300
cgttgcgtta tgaagatttt gaagccagta aagaaaaaaa agatcaaaag agagatcaag 360
attctgcaaa acctttgtgg agggcccaac attgtgaagc ttctggacat tgtccgtgat 420
cagcaatcga agacacccag cctaattttt gagtatgtga acaatactga tttcaaagtg 480
ctctacccca ctcttacaga ctttgatatc cgatactaca ttcatgagct gctcaaggct 540
ttggactatt gccattctca agggattatg cacagggatg tgaagccaca caacgtgatg 600
attgaccatg agcagcggaa gcttaggctt attgactggg gacttgccga attctatcat 660
cctggcaaag agtataatgt gcgtgttgcc tctaggtact tcaagggtcc tgagctgctg 720
gttgatcttc aagattatga ttactctctc gacatgtgga gcttggggtg catgtttgcc 780
ggcatgatat ttcggaagga gccattcttt tatgggcatg acaattatga tcaacttgtg 840
aagattgcta aggtgttggg aactgatgaa ttgaattcct atctaaacaa ataccgccta 900

gagctggacc cccatttgga agcactggtt ggcaggcata gcaggaaacc ttggtcaaag 960
ttcatcaatg ctgataatca gcgtctggtt gttccagagg ctgtggattt tttggataag 1020
cttctacgct acgatcatca agacaggctg actgcgaagg aagctatggc acatccctat 1080
ttttatcccg tgaaggtgtc ggaggttagc aaccgtcgca gtgcttgata tgaattgata 1140
tatctcatat gggctttctt gtgattacgt cccacccggc taccaggttt ctcagttgtg 1200
cgaagcgctg agctcgc 1217

<210> 21
<211> 1718
<212> DNA
<213> Physcomitrella patens

<400> 21
atcccgggcg agccatggcg ccacttgctt cggcgaatgg gactgtttga cttcttcgct 60
tcgcccccgc ctcgcccttc accctcctct gttcttgtca cagcctcctc ctccgtctct 120
gtctgttggc tgggtaagtt ttgggagtga ggaggacgtg gtcatggaag aagagccccc 180
ctcttttgta gtggactgtc ggtaaattgg acctggagcc tgccggctca tcgcgtttgc 240
ttagattgtg ggcgggtgct gttgaaattc cttgaacttg ctactggtcg gaaacgctcg 300
aattgcgact ttgattgaag gtctggttgt tgctgcggtc gggatcttac tcagtctctt 360
caataggacc tctgaagcag tatggagact agcagtggaa ctccagaatt gaaagttata 420
agtactccga cctacggagg tcattacgtg aaatatgttg tggcgggaac tgatttcgaa 480
gtcaccgcga ggtacaagcc accacttcgt ccgattgggc gcggagctta tggaatcgtc 540
tgttcactct ttgataccgt tacgggtgag gaggtggcgg tcaaaaagat tggaaacgcc 600
ttcgacaaca ggatcgatgc gaagcgaaca ctgcgtgaaa taaaactcct ccggcatatg 660
gatcatgaaa acgtcgttgc cattacagac atcattcgtc ccccaactag ggagaatttc 720
aacgacgtgt acattgtata cgagttgatg gatacggacc tacaccagat cattcgttca 780
aatcaagctc tcacagaaga ccactgtcag tattttctgt atcaaatctt gcggggcttg 840
aagtacatcc attcggcgaa cgtcttgcac cgggacttga agcccaccaa ccttctcgtc 900
aatgccaatt gcgatttgaa aatcgcagat tttggcttgg cacgcactct ctctgaaacg 960
gatttcatga ctgagtatgt tgtaacgagg tggtacagag ctccagagct gctcctgaat 1020
tgttcagcat acactgcagc tattgacatt tggtctgtgg ggtgcatctt catggagttg 1080
cttaaccgat ctgcgttgtt ccctgggaga gactatgtgc atcagctccg cctaattaca 1140
gaactcatcg gaactcctga agatagggat cttgggtttt tgagaagcga caatgctagg 1200
cggtatatca agcacctgcc tcgacagtcg cctattccct taacccagaa gttcagaggc 1260
attaatcgtt ctgctcttga tcttgttgaa aagatgctgg tctttgatcc agcgaaaaga 1320
atcacagtgg aagctgcctt ggcgcaccct tatttagctt cacttcatga catcaacgat 1380
gagcctgcct cggtatctcc cttcgagttt gacttcgagg agccccctat ctcggaggag 1440
catatcaagg atctcatttg gagggaggct ctggattgca gcttaggtcc tgatgatatg 1500
gtgcagtaac ttcacacttc atctcaagtt gtaaggccta ctctcaattc tttaggtggc 1560
tacaacgcta tcccggcgtt gtatggtttt gcaacttatt ccccccgtg tgattacact 1620
attggattat agaatgacaa ttcgttagtt cttttccctg gcgctatatc tttgtctgca 1680
catttcatcc agcagacatt gttgctcggc gttaacgc 1718

<210> 22
<211> 2177
<212> DNA
<213> Physcomitrella patens

<400> 22
atcccgggct tgtattggct cggataattt atgttgacaa ttgatttgtg aggcttcgta 60
ttgagtcagc gagcaggctg agagttcggc agcgaagtta cactcgacct ggctgaaatt 120
tggaattgaa gcgcgtgaag cttcatctgt gattttggag gttgtttgac tgatgagaag 180
aggtctctga gctgagaatg tttgcaattt aggggcacca ccggtttgtt ggagtccctt 240
gccacttatt acaattgttg gtttacaagc tcgacgagtt tcaatcgaac gtagagtttt 300
agtcgggtcg aggatctatg tatccgctca gcggagaaga gagcctgatg ttgccgaagc 360
gatcgtgtgg gatttgacta gaaagaggtg gaccgcatca gaactattta ttccttgtga 420

gggaaggatc gaggttccaa tgggtctcac tccgttttct tgtgtcacgg ttcaaggtta 480
tgtccgggtg gtctaccccg acggccacgt cgagaatctg agcaaatctt gtagcgtgca 540
cgatcttctt ctgggtaatc cagactacta tgtctgcggt agcacccctt acacaatcac 600
caatcgtatg gcagcggaag aggtgctcga gtatggggtg acctacttcg tttgcgcaac 660
gccaaatgcc caacctttct tagaacgtca gccgaaggta gtacatcgag gatccaagat 720
tttgccacga ttttccaaac atggggtcca tgtgcgggag ttgcgaagcc cgacgcatgg 780
gagccaacag tcacggaagg tttttgatta tcattcagta acgatgcagc agcttgaatc 840
catacgaaac gagggcccag agcctcacct cgctggagac cgaccatcga agcaccttaa 900
gctcgttttc attcggcatt gcttgcgagc acttcgactt cctagaattt caatagacct 960
aatggaatcg ccactcccta atctttccgg agaggcctta tcgccgacgg caactgccaa 1020
agacgagatt actcagatga tactaaaaag tgccgcaagg tccgaattag gaatgtatgt 1080
ttcgaagaga caggaattct atcttcgaag agcgcgtagg cggcgtaagt ttgcgtggaa 1140
gccggttttg cagagcatct ccgagatgaa gcctgtcatg gaattccaca ctccgatggc 1200
ttaccgggat agtgggtctc cgccgaagaa cgcctctacc ccatccttac ctggcccgaa 1260
gaacatttca ccgccacgac aagtgagtgt cccgcaaagg agcagtcctc cgccgaagaa 1320
cgtctcacca cctccccagc ccgcatttgt agcgcggact gcgtcgaagt attctgctgc 1380
atctcagcaa gttcaacgaa atcgaggcaa cgcgaaatct ctttatatgg cgtagtttgt 1440
gtctcgactg aactcctatc tattccccca tcgagataac tgcattcgtt ggataaattt 1500
ctccaacatt tttgctcttc atcctcaagc agctcctcaa tggccagtaa tatgttacga 1560
cattgtgcac aactccaatt acgtagcgtt attctgtaac ccacgttcat cgaggtatca 1620
aggaatggcg cagtaagcac tgctactttg tgctttggta tcccgttgtg acgagatgtc 1680
atgtcgcacc gtgcctatca gtgggatttt cttgagcgca gatcttgctt ccgcagtttg 1740
tttcataacg ttttggttcg taggggcct agacggtact atcaagcaat gagaagtgtg 1800
ctggtgtgga tttgacagca atcttttgga ggattgtctt tcctatgtag aacatagcga 1860
ggacacttgc gcctggtggg cacatcccat agaacatagt gcttcacttc tgggttgttc 1920
accactagga tcatatgacc ttctcatcta ttttcgggct ttgtttcgag ctcatgtacc 1980
atcgactagc gtcactttga ctgcggtgat aatcgtttgt caatttagtg gagctttgta 2040
gatgatagat gccatttgta cagtagcttg gatgctgttt acaagatagc ggcagctaga 2100
agccttaaac ctttagctac catgtattat ttaaacctat atgaagtgaa cggctgtgca 2160
gatattgccg ttaacgc 2177

<210> 23
<211> 1731
<212> DNA
<213> Physcomitrella patens

<400> 23
atcccgggcg gtcgagtcgt attaggtgtt gtttcattgt aagggttcgg aagcacgggg 60
cacggcgtat ataccgttcc ccttgaacgt tgatctcacc tttggaagac ctgaattgag 120
tagcgtgcgg aagctgcatc gatccggaag agacgatgag taggagagtg agaaggggag 180
gtcttcgcgt cgcggtgccg aagcaagaga ctcccgtcag caaatttttg actgccagtg 240
gaactttcca ggatgatgat atcaagctca accacaccgg gcttcgcgtc gtctcttcag 300
aacctaacct tcctacgcag acgcagtcta gctccccaga tgggcaactg tcaatagcag 360
acctggagtt agtgcggttc ttgggaaagg gtgcgggtgg aaccgtgcag cttgtccggc 420
acaaatggac caatgtcaat tatgcactga aggcgataca aatgaatatc aacgaaacag 480
tgaggaagca gattgttcag gagctgaaaa tcaaccaagt gacgcaccag cagtgccctt 540
atatcgtgga atgcttccac tccttctacc acaacggcgt catatccatg atcctagagt 600
acatggacag gggctcgttg tccgacatta ttaagcaaca aaagcagata cctgagccgt 660
atttggccgt cattgctagt caagttctga agggattgga atacctacac caagtcaggc 720
acatcataca tcgtgatata aagccctcca acctcctcat caatcacaag ggtgaggtca 780
aaatatctga ttttggtgtc agtgctgtgt tggttcattc cttggcccag cgagacacgt 840
tcgttgggac ttgcacatat atgtcgccag aacgccttca ggggcgttcg tatgcatacg 900
acagtgacct atggagttta ggattgactc ttttggagtg tgcgttgggt accttcccat 960
acaaaccagc tggaatggaa gagggttggc aaaatttctt catcctcatg gaatgtatag 1020
ttaatcaacc ccccgcagcc gcatcccctg acaaattctc ccccgaattt tgttctttta 1080
ttgaatcctg catccggaaa tgtcccagtg aacgaccatc aactactgat ttacttaaac 1140
atccgttcct gcaaaagtac aacgaggaag agtaccattt gagcaagatt ttgtaactta 1200

aagttagcct cgcatggcgt gcagagactg tcactaccac aagcctgatc caccactgaa 1260
cttcaaggga ctttaccaaa agcatggtcg aactacctcg ccaatccgcc actttctcaa 1320
tgccttttcc ttatatagtc atatgtggtc aagttgagaa cgatatcaaa tcagattgac 1380
ggaaaaaaca tcttcaacgc cgtttcccaa ccttatagaa agtggagttt tctcaatgag 1440
ccccatttgt cgctgagaac gtgcagctca tgaaacaatc cataagtgtg ttaatcgggg 1500
tcttatatta tcatcaccat gctagctttt tatgttacct gcacttttc tttccttatt 1560
gcacagcatc gaacacttct tcgataccca aaacaatatt tccatcttct ttcttctttt 1620
tttcacgtct tgcgacaagg aatttcctca cggagatttt tcaacacttt tctcaaatgt 1680
ttttagagtt tttaaactga caattgaaga ggtcggacct accggactcg c 1731

<210> 24
<211> 1407
<212> DNA
<213> Physcomitrella patens

<400> 24
atcccgggag aggctgatct gatgctacag tttcgtgtgc agctagtctt tagagattcg 60
ggcaacgcac ttgttgaaga tcggaaactt tcaaaatcgg tcgagtcgta ttaggtgttg 120
tttcattgta agggttcgga agcacggggc acggcgtata taccgttccc cttgaacgtt 180
gatctcacct ttggaagacc tgaattgagt agcgtgcgga agctgcatcg atccggaaga 240
gacgatgagt aggagagtga gaaggggagg tcttcgcgtc gcggtgccga agcaagagac 300
tcccgtcagc aaatttttga ctgccagtgg aactttccag gatgatgata tcaagctcaa 360
ccacaccggg cttcgcgtcg tctcttcaga acctaacctt cctacgcaga cgcagtctag 420
ctccccagat gggcaactgt caatagcaga cctggagtta gtgcggttct taggaaaggg 480
tgcgggtgga accgtgcagc ttgtccggca caaatggacc aatgtcaatt atgcactgaa 540
ggcgatacaa atgaatatca acgaaacagt gaggaagcag attgttcagg agctgaaaat 600
caaccaagtg acgcaccagc agtgccctta tatcgtggaa tgcttccact ccttctacca 660
caacggcgtc atatccatga tcctagagta catggacagg ggctcgttgt ccgacattat 720
taagcaacaa aagcagatac ctgagccgta tctggccgtc attgctagtc aagttctgaa 780
gggattggaa tacctacacc aagtcaggca catcatacat cgtgatataa agccctccaa 840
cctcctcatc aatcacaagg gtgaggtcaa aatatctgat tttggtgtca gtgctgtgtt 900
ggttcattcc ttggcccagc gagacacgtt cgttgggact tgcacatata tgtcgccaga 960
acgccttcag gggcgttcgt atgcatacga cagtgaccta tggagtttag gattgactct 1020
tttggagtgt gcgttgggta ccttcccata caaaccagct ggaatggaag agggttggca 1080
aaatttcttc atcctcatgg aatgtatagt taatcaaccc cccgcagccg catcccctga 1140
caaattctcc cccgaatttt gttcttttat tgaatcctgc atccggaaat gtcccagtga 1200
acgaccatca actactgatt tacttaaaca tccgttcctg caaaagtaca acgaggaaga 1260
gtaccatttg agcaagattt tgtaacttaa agttagcctc gcatggcgtg cagagactgt 1320
cactaccaca agcctgatcc accactgaac ttcaagggac tttaccaaaa gcatggtcga 1380
actacctcgc caatccgcca gagctca 1407

<210> 25
<211> 2253
<212> DNA
<213> Physcomitrella patens

<400> 25
atcccgggtg taggcgggcg aggttcgatg caatggggca gtgttatgga aagtttgatg 60
atggaggcga aggggaggat ttgtttgagc ggcagaaagt gcaggtttct aggacgccaa 120
agcatggatc gtggagcaat agcaaccgag ggagcttcaa caatggcggg ggggcctcgc 180
ctatgagagc caagacgtcg ttcgggagca gccatccgtc cccgcggcat ccctcagcta 240
gtccgctccc tcactacacg agctccccag cgccttcgac cccgcgacgg aacattttca 300
aaaggccttt tcctcctcct tctcccgcga agcacattca gtccagtctc gtgaaacggc 360
atggcgcgaa gccgaaagaa ggaggggcga tccctgaggc tgtcgatggt gagaagccct 420
tggataagca tttcggctat cacaagaact tcgctactaa gtatgagctg gggcatgaag 480
tcggtcgcgg gcacttcggt cacacatgtt acgcgaaagt acggaagggc gagcataagg 540

gacaagccgt ggcagtgaag ataatctcga aagcgaagat gacgactgct attgcgatcg 600
aggacgtggg acgagaagtg aaaattttga aggctctgac gggacaccag aatttggttc 660
gattctacga ttcctgcgag gaccatctaa atgtgtacat tgttatggaa ttatgtgaag 720
gaggtgaatt attggatcga attttgtctc ggggagggaa gtactcggag gaagacgcca 780
aggttgttgt gcggcagatt ttgagcgttg ttgcgttttg tcacctgcaa ggcgttgttc 840
accgagatct taagcctgag aattttctgt ttaccacgaa ggatgaatat gctcagctta 900
aggccattga ttttggattg tcagatttca tcaaacccga tgaaagactg aacgatatcg 960
ttggaagcgc atactacgtt gcgccggagg tattgcatag gttatattca atggaagctg 1020
acgtatggag cattggagtc atcacgtaca ttttgttatg tggtagtcga ccgttttggg 1080
cgcggaccga gtcgggcatt tttcgtgcgg tgttgagggc tgacccgagc tttgaagaag 1140
ccccttggcc ttccatctct cccgaagcca aggatttcgt gaagcgtctc ctgaataagg 1200
atatgcggaa acgcatgact gctgcacaag ctttaactca tccatggatt cgaagtaaca 1260
acgtgaagat acctctggat atcttagtgt acagacttgt gaggaattat cttcgtgcat 1320
catccatgag aaaggctgct ttgaaggccc tgtcaaagac tttaaccgaa gacgagactt 1380
tttatctacg tactcaattt atgctgctag aaccaagtaa caacggtcgt gttacttttg 1440
agaatttcag acaggcactg ctgaaaaatt caacagaggc catgaaagag tcacgggttt 1500
ttgaaattct ggaatcgatg gatggtcttc atttcaagaa aatggacttt tcagagttct 1560
gtgcagcggc cattagtgtt ctccagttag aagccacaga acgatgggag cagcatgctc 1620
gcgcagctta cgacatattt gagaaagagg gtaaccgagt catttatcct gatgaacttg 1680
cgaaagagat gggactagca ccaaatgtac cagcccaagt gtttctagat tggattagac 1740
agtctgatgg tcggctgagt ttcactgggt tcaccaagct gctacatgga atttccagcc 1800
gtgctatcaa aaatctccag cagtgattct ttgcatcgta cagttcggaa tggagttttt 1860
aagctctttt agtttcactt ccgtcttcaa ctgctgcttc gcctcgtctc tgagctgtga 1920
tagcgtatct caagcatatg cacaactcgc atttttgctg aagtgatttg tcacctcaca 1980
ttagtcgggc ctctggaact ttcacttatt tggattattt atgtagaagt ccagatcaaa 2040
aagcgaaaag gaatggctag atattgtcac aagaagtaac atagtcaaat tcaggagcac 2100
ttaagcacac attgagtgct ttttattgga attcttagat atggaactga tgtttccaag 2160
ggaagggtct atgaggcaga gagtggaatg tatagactgg catatggtta agtgatcatt 2220
ggactgccgt tctactccgg ttgtcgttaa cgc 2253

<210> 26
<211> 2230
<212> DNA
<213> Physcomitrella patens

<400> 26
atcccgggcg aactgcgatc tgagattcca acttggaagg gcctcgcgta agaccggatc 60
tcgtttctta cgcttttgcg cctcgcgata tttgtacatt gtttcctctg gttttattcg 120
attccgcctc tgaaaatgtg aacgggctgc aagcttggtt ttggagcaac gttggagcat 180
tgaagggttg cgctcgtccc tgcccattcc tcgcttctgc tctggcctat gtcatgacga 240
cgtgaaggag aggatttgag ggttttgtaa gtgatataat cctccccgag gagatttctg 300
tgagttgatt aacttggatc agcgacatgg ggaacactag ttcgagggga tcgaggaagt 360
ccactcggca ggtgaatcag ggagtcgggt ctcaagacac ccgagagaag aatgatagcg 420
tcaatccaaa gacgagacag ggtggtagcg ttggcgcaaa caactatggc ggaaagccaa 480
gcagtggtgc tcaggccgga gaacgatcca cctctgcgcc cgctgctctg ccgaggccga 540
agccagcatc gaggtcagta tccggtgttt tgggtaagcc gctgtcagat attcgtcaat 600
cttacatcct gggacgggag cttggccgag ggcagttcgg agtgacttac ttgtgtactg 660
acaagatgac gaatgaggcg tacgcgtgca agagcatcgc caaacggaaa ctgaccagta 720
aggaggatat cgaggatgtt aagcgggagg ttcagattat gcatcacctg tcggggacac 780
ccaatatcgt ggtgttaaag gatgtgttcg aggacaagca ttccgtgcat cttgtgatgg 840
agctctgtgc aggtggcgag ctcttcgatc gcatcattgc caaggggcat tacagtgagc 900
gcgccgctgc cgatatgtgc agagtcatcg tcaatgtggt gcacagatgc cactcattag 960
gggtcttcca tcgggatctc aagccagaga attttctgtt ggccagcaag gctgaggatg 1020
cgcctctgaa ggccacagac ttcggtctgt caactttctt taagccagga gatgtgttcc 1080
aggatattgt tggaagtgcg tattacgtgg cccctgaagt tttgaagaga agttatggtc 1140
ctgaagctga tgtttggagt gcaggcgtga ttgtgtacat tctgctgtgt ggtgtacccc 1200
ccttctgggc tgaaactgag cagggtatct ttgacgctgt gctcaaaggg cacatagact 1260

```
tcgagaacga tccatggccg aaaatctcca acggggctaa ggatttggtg aggaaaatgc 1320
taaaccctaa cgtgaagata cgtctgacgg cacagcaggt gttgaaccat ccatggatga 1380
aggaagatgg tgatgctcca gacgtgccac tcgacaatgc ggtgttgacc agactgaaaa 1440
atttctcagc cgccaacaag atgaaaaagc tggcgctgaa ggtgattgca gagagtctgt 1500
cggaggaaga gatcgtgggg ttgagggaga tgttcaaatc catagataca gacaacagcg 1560
gcacggtgac gttcgaggag cttaaggaag ggttgctgaa gcagggctca aaacttaatg 1620
aatcggacat caggaaacta atggaagctg cagatgtcga tggaaacggc aagatcgact 1680
tcaacgagtt catatcggca acaatgcaca tgaacaagac ggagaaagag gatcaccttt 1740
gggcagcatt catgcatttc gacacggaca atagcgggta tatcaccatc gacgagcttc 1800
aggaagcaat ggagaagaat ggaatgggag atcctgagac catccaagag atcatcagcg 1860
aggtggacac agacaacgac ggaagaatag actacgacga gttcgtagcc atgatgcgca 1920
agggcaatcc tggcgctgaa aacggaggaa cggtgaacaa gcccagacac aggtagtagc 1980
tcctggttgc caatttgacg acgggtttgg caaggcaaca gtagttgttg ttagctttca 2040
gattcaggtt cggtattgtt catgccctcc tttgtctcga acaatggact ctaggccttt 2100
ccaatggaaa agctattcca acagggtttg cataacgtgt agtagaatga aagcattgcc 2160
tgggggtgt acagtgcctg tgatcttgtg gagttctcgt aggatggctt cggttggatc 2220
tcgttaacgc                                                       2230


<210> 27
<211> 749
<212> PRT
<213> Physcomitrella patens

<400> 27
Met Gly Val Asp Met Lys Ala Pro Ala Lys Gln Ser Leu Gly Val Gly
  1               5                  10                  15

Leu Leu Leu Cys Ser Val Val Ile Leu Ser Val Val Ser Ser Val Tyr
             20                  25                  30

Gly Gln Val Gln Thr Asp Pro Val Asp Thr Thr Gly Leu Ile Ser Met
         35                  40                  45

Trp Tyr Asp Leu Lys Gln Ser Gln Ser Leu Thr Gly Trp Thr Gln Asn
     50                  55                  60

Ala Ser Asn Pro Cys Gly Gln Gln Trp Tyr Gly Val Val Cys Asp Gly
 65                  70                  75                  80

Ser Ser Val Thr Glu Ile Lys Ile Gly Ser Arg Gly Leu Asn Gly Asn
                 85                  90                  95

Phe Asn Pro Ser Tyr Phe Gln Asn Ala Phe Lys Lys Leu Arg Ile Phe
            100                 105                 110

Asp Ala Ser Asn Asn Asn Ile Glu Gly Asn Ile Pro Gln Gln Phe Pro
        115                 120                 125

Thr Ser Leu Thr Gln Met Ile Leu Asn Asn Asn Lys Leu Thr Gly Gly
    130                 135                 140

Leu Pro Gln Phe Asp Gln Leu Gly Ala Leu Thr Val Val Asn Leu Ser
145                 150                 155                 160

Asn Asn Asn Leu Thr Gly Asn Met Asn Pro Asn Tyr Phe Asn Val Ile
                165                 170                 175
```

```
Val Asn Val Glu Thr Phe Asp Val Ser Tyr Asn Gln Leu Glu Gly Thr
            180                 185                 190

Leu Pro Asp Ser Ile Leu Asn Leu Ala Lys Leu Arg Phe Leu Asn Leu
        195                 200                 205

Gln Asn Asn Lys Phe Asn Gly Lys Leu Pro Asp Asp Phe Ser Arg Leu
    210                 215                 220

Lys Asn Leu Gln Thr Phe Asn Ile Glu Asn Asp Gln Phe Thr Gly Asn
225                 230                 235                 240

Tyr Pro Ser Gly Leu Pro Ser Asn Ser Arg Val Gly Gly Asn Arg Leu
                245                 250                 255

Thr Phe Pro Pro Pro Pro Ala Pro Gly Thr Pro Ala Pro Arg Thr Pro
            260                 265                 270

Ser Pro Ser Gly Thr Ser Asn Gly Ser Ser Ser His Leu Pro Leu Gly
        275                 280                 285

Ala Ile Ile Gly Ile Ala Ala Gly Gly Ala Val Leu Leu Leu Leu Leu
    290                 295                 300

Ala Leu Gly Ile Cys Leu Cys Cys Arg Lys Arg Ser Lys Lys Ala Leu
305                 310                 315                 320

Gly Asp Pro Glu Ala Thr Thr Ser Ser Arg Arg Pro Trp Phe Thr Pro
                325                 330                 335

Pro Leu Ser Ala Lys Ser Gln Ser Asp Pro Ser Lys Ser Ile Asp Lys
            340                 345                 350

Thr Thr Lys Arg Asn Ile Phe Gly Ser Ser Lys Ser Glu Lys Lys Ser
        355                 360                 365

Ser Lys His Arg Val Phe Glu Pro Ala Pro Leu Asp Lys Gly Ala Ala
    370                 375                 380

Asp Glu Pro Val Val Lys Ala Ser Pro Pro Val Lys Val Leu Lys Ala
385                 390                 395                 400

Pro Pro Ser Phe Lys Gly Ile Ser Gly Leu Gly Ala Gly His Ser Lys
                405                 410                 415

Ala Thr Ile Gly Lys Val Asn Lys Ser Asn Ile Ala Ala Thr Pro Phe
            420                 425                 430

Ser Val Ala Asp Leu Gln Ala Ala Thr Asn Ser Phe Ser Gln Asp Asn
        435                 440                 445

Leu Ile Gly Glu Gly Ser Met Gly Arg Val Tyr Arg Ala Glu Phe Pro
    450                 455                 460

Asn Gly Gln Val Leu Ala Val Lys Lys Ile Asp Ser Ser Ala Ser Met
465                 470                 475                 480
```

Val Gln Asn Glu Asp Asp Phe Leu Ser Val Val Asp Ser Leu Ala Arg
485 490 495

Leu Gln His Ala Asn Thr Ala Glu Leu Val Gly Tyr Cys Ile Glu His
500 505 510

Asp Gln Arg Leu Leu Val Tyr Glu Tyr Val Ser Arg Gly Thr Leu Asn
515 520 525

Glu Leu Leu His Phe Ser Gly Glu Asn Thr Lys Ala Leu Ser Trp Asn
530 535 540

Val Arg Ile Lys Ile Ala Leu Gly Ser Ala Arg Ala Leu Glu Tyr Leu
545 550 555 560

His Glu Val Cys Ala Pro Pro Val Val His His Asn Phe Lys Ser Ala
565 570 575

Asn Ile Leu Leu Asp Asp Glu Leu Asn Pro His Val Ser Asp Cys Gly
580 585 590

Leu Ala Ala Leu Ala Pro Ser Gly Ser Glu Arg Gln Val Ser Ala Gln
595 600 605

Met Leu Gly Ser Phe Gly Tyr Ser Ala Pro Glu Tyr Ala Met Ser Gly
610 615 620

Thr Tyr Thr Val Lys Ser Asp Val Tyr Ser Phe Gly Val Val Met Leu
625 630 635 640

Glu Leu Leu Thr Gly Arg Lys Ser Leu Asp Ser Ser Arg Pro Arg Ser
645 650 655

Glu Gln Ser Leu Val Arg Trp Ala Thr Pro Gln Leu His Asp Ile Asp
660 665 670

Ala Leu Ala Arg Met Val Asp Pro Ser Leu Lys Gly Ile Tyr Pro Ala
675 680 685

Lys Ser Leu Ser Arg Phe Ala Asp Ile Val Ala Leu Cys Val Gln Pro
690 695 700

Glu Pro Glu Phe Arg Pro Pro Met Ser Glu Val Val Gln Ala Leu Val
705 710 715 720

Arg Leu Met Gln Arg Ala Ser Leu Ser Lys Arg Arg Ser Glu Ser Ala
725 730 735

Val Gly Ile Glu Ser Asn Glu Pro Ser Glu Thr Ser Leu
740 745

<210> 28
<211> 308
<212> PRT
<213> Physcomitrella patens

<400> 28

Met Ser Val Ser Gly Met Asp Asn Tyr Glu Lys Leu Glu Lys Val Gly
1 5 10 15

Glu Gly Thr Tyr Gly Lys Val Tyr Lys Ala Arg Asp Lys Arg Ser Gly
20 25 30

Gln Leu Val Ala Leu Lys Lys Thr Arg Leu Glu Met Glu Glu Glu Gly
35 40 45

Val Pro Ser Thr Ala Leu Arg Glu Val Ser Leu Leu Gln Met Leu Ser
50 55 60

His Ser Met Tyr Ile Val Arg Leu Leu Cys Val Glu His Val Glu Lys
65 70 75 80

Gly Ser Lys Pro Met Leu Tyr Leu Val Phe Glu Tyr Met Asp Thr Asp
85 90 95

Leu Lys Lys Tyr Ile Asp Leu His Gly Arg Gly Pro Ser Gly Lys Pro
100 105 110

Leu Pro Pro Lys Val Val Gln Ser Phe Met Tyr Gln Leu Cys Thr Gly
115 120 125

Leu Ala His Cys His Gly His Gly Val Met His Arg Asp Leu Lys Pro
130 135 140

Gln Asn Leu Leu Val Asp Lys Gln Thr Arg Arg Leu Lys Ile Ala Asp
145 150 155 160

Leu Gly Leu Gly Arg Ala Phe Thr Val Pro Met Lys Ser Tyr Thr His
165 170 175

Glu Ile Val Thr Leu Trp Tyr Arg Ala Pro Glu Val Leu Leu Gly Ala
180 185 190

Thr His Tyr Ser Leu Pro Val Asp Ile Trp Ser Val Gly Cys Ile Phe
195 200 205

Ala Glu Leu Val Arg Lys Met Pro Leu Phe Thr Gly Asp Ser Glu Leu
210 215 220

Gln Gln Leu Leu His Ile Phe Arg Leu Leu Gly Thr Pro Asn Glu Thr
225 230 235 240

Ile Trp Pro Gly Val Ser Gln His Arg Asp Trp His Glu Phe Pro Gln
245 250 255

Trp Arg Pro Gln Asp Leu Ser Leu Ala Val Pro Gly Leu Ser Ala Val
260 265 270

Gly Leu Asp Leu Leu Ala Lys Met Leu Val Phe Glu Pro Ser Lys Arg
275 280 285

Ile Ser Ala Lys Ala Ala Leu Ser His Thr Tyr Phe Ala Asp Val Asp
290 295 300

Lys Thr Ala Thr
305

<210> 29
<211> 425
<212> PRT
<213> Physcomitrella patens

<400> 29
Met Ala Asp Ala Lys Glu Glu Leu Ala Leu Arg Thr Glu Met His Trp
1 5 10 15

Ala Val Arg Ser Asn Asp Val Gly Leu Leu Arg Thr Ile Leu Lys Lys
20 25 30

Asp Lys Gln Leu Val Asn Ala Ala Asp Tyr Asp Lys Arg Thr Pro Leu
35 40 45

His Ile Ala Ala Ser Leu Asp Cys Val Pro Val Ala Lys Val Leu Leu
50 55 60

Ala Glu Gly Ala Glu Leu Asn Ala Lys Asp Arg Trp Gly Lys Ser Pro
65 70 75 80

Arg Gly Glu Ala Glu Ser Ala Gly Tyr Met Glu Met Val Lys Leu Leu
85 90 95

Lys Asp Tyr Gly Ala Glu Ser His Ala Gly Ala Pro Arg Gly His Val
100 105 110

Glu Ser Leu Ile Gln Val Ala Pro Pro Leu Pro Ser Asn Arg Asp Trp
115 120 125

Glu Ile Ala Pro Ser Glu Ile Glu Leu Asp Thr Ser Glu Leu Ile Gly
130 135 140

Lys Gly Ala Phe Gly Glu Ile Arg Lys Ala Leu Trp Arg Gly Thr Pro
145 150 155 160

Val Ala Val Lys Thr Ile Arg Pro Ser Leu Ser Asn Asp Arg Met Val
165 170 175

Ile Lys Asp Phe Gln His Glu Val Gln Leu Leu Val Lys Val Arg His
180 185 190

Pro Asn Ile Val Gln Phe Leu Gly Ala Val Thr Arg Gln Arg Pro Leu
195 200 205

Met Leu Val Thr Glu Phe Leu Ala Gly Gly Asp Leu His Gln Leu Leu
210 215 220

Arg Ser Asn Pro Asn Leu Ala Pro Asp Arg Ile Val Lys Tyr Ala Leu
225 230 235 240

Asp Ile Ala Arg Gly Met Ser Tyr Leu His Asn Arg Ser Lys Pro Ile
245 250 255

Ile His Arg Asp Leu Lys Pro Arg Asn Ile Ile Val Asp Glu Glu His
260 265 270

Glu Leu Lys Val Gly Asp Phe Gly Leu Ser Lys Leu Ile Asp Val Lys
275 280 285

Leu Met His Asp Val Tyr Lys Met Thr Gly Gly Thr Gly Ser Tyr Arg
290 295 300

Tyr Met Ala Pro Glu Val Phe Glu His Gln Pro Tyr Asp Lys Ser Val
305 310 315 320

Asp Val Phe Ser Phe Gly Met Ile Leu Tyr Glu Met Phe Glu Gly Val
325 330 335

Ala Pro Phe Glu Asp Lys Asp Ala Tyr Asp Ala Ala Thr Leu Val Ala
340 345 350

Arg Asp Asp Lys Arg Pro Glu Met Arg Ala Gln Thr Tyr Pro Pro Gln
355 360 365

Met Lys Ala Leu Ile Glu Asp Cys Trp Ser Pro Tyr Thr Pro Lys Arg
370 375 380

Pro Pro Phe Val Glu Ile Val Lys Lys Leu Glu Val Met Tyr Glu Asp
385 390 395 400

Cys Leu Leu Arg Leu Pro Lys Asp Arg Arg His Leu Arg Asp Ile Leu
405 410 415

His Leu Arg Arg Asn Pro Ala Asp Ser
420 425

<210> 30
<211> 283
<212> PRT
<213> Physcomitrella patens

<400> 30
Met Lys Arg Tyr Gln Arg Arg Lys Val Gln Arg Leu Gly Arg Glu Gly
1 5 10 15

Gln Val Leu Leu Glu Arg Thr Leu Phe Lys Gln Leu Arg Pro Ser Pro
20 25 30

Phe Val Pro His Leu Leu Ala Thr Pro Ile Asp Ser Asp Asn Val Ala
35 40 45

Leu Val Leu Asn Cys Val Leu Ala Gly Pro Leu Glu Leu Leu Leu Arg
50 55 60

Ser Pro Leu Asp Glu Asn Ser Ala Arg Phe Leu Val Ala Asn Val Val
65 70 75 80

Leu Ala Val Glu Leu Leu His Lys Asp Gly Val Val Tyr Arg Gly Ile
85 90 95

```
Ser Pro Asp Val Leu Met Ile Asp Arg Lys Gly Arg Leu Gln Leu Val
            100                 105                 110

Asp Phe Arg Phe Ala Lys Gln Met Ser Asp Glu Arg Thr Phe Thr Val
        115                 120                 125

Cys Gly Met Ala Asp Phe Leu Ala Pro Glu Ile Ile Gln Gly Gln Gly
    130                 135                 140

His Gly Leu Ala Ser Asp Trp Trp Ala Val Gly Val Leu Met Tyr Phe
145                 150                 155                 160

Met Leu Gln Thr Glu Leu Pro Phe Gly Ser Trp Arg Asp Asn Glu Leu
                165                 170                 175

Glu Ile Phe Gly Arg Ile Ala Arg Arg Gln Leu Thr Phe Pro Ser Ser
            180                 185                 190

Phe Ser Pro Glu Ala Val Asp Leu Ile Asp Lys Leu Leu Val Val Asp
        195                 200                 205

Pro Thr Lys Arg Leu Gly Cys Asp Ser His Gly Ser Leu Ala Ile Arg
    210                 215                 220

Glu His Pro Trp Phe Arg Gly Ile Asn Trp Asp Lys His Leu Asp Cys
225                 230                 235                 240

Ser Val Glu Val Pro Ser Glu Ile Met Thr Arg Leu Gln Leu Ala Ile
                245                 250                 255

Asp Phe Leu Pro Val Asp Asp Ser Tyr Gln Val Phe Asp Leu Gln Pro
            260                 265                 270

Asp Glu Asp Asp Pro Pro Trp Leu Asp Gly Trp
        275                 280
```

<210> 31
<211> 417
<212> PRT
<213> Physcomitrella patens

<400> 31

```
Met Asp Leu Gly Gly Asp Arg Met Arg Ala Pro Gln Arg Gln Ser Arg
  1               5                  10                  15

Glu Tyr Gln Tyr Arg Ser Leu Asp Val Phe Thr Glu Gln His Glu Gln
             20                  25                  30

Leu Gln Lys Gln Gln Gln Gln Asp Glu Tyr Gln Arg Thr Glu Leu Lys
         35                  40                  45

Leu Glu Thr Leu Pro Lys Met Leu Ser Asn Ala Thr Val Ser Ser Ser
     50                  55                  60

Pro Arg Ser Ser Pro Asp Gly Arg Arg Leu Arg Thr Val Ala Asn Lys
 65                  70                  75                  80
```

Tyr Ala Val Glu Gly Met Val Gly Ser Gly Ala Phe Cys Lys Val Tyr
85 90 95

Gln Gly Ser Asp Leu Thr Asn His Glu Val Val Gly Ile Lys Leu Glu
100 105 110

Asp Thr Arg Thr Glu His Ala Gln Leu Met His Glu Ser Arg Leu Tyr
115 120 125

Asn Ile Leu Arg Gly Gly Lys Gly Val Pro Asn Met Arg Trp Phe Gly
130 135 140

Lys Glu Gln Asp Tyr Asn Val Met Val Leu Asp Leu Leu Gly Pro Asn
145 150 155 160

Leu Leu His Leu Phe Lys Val Cys Gly Leu Arg Phe Ser Leu Lys Thr
165 170 175

Val Ile Met Leu Gly Tyr Gln Met Ile Asp Arg Val Glu Tyr Val His
180 185 190

Ser Arg Gly Leu Val His Arg Asp Leu Lys Pro Asp Asn Phe Leu Met
195 200 205

Gly Cys Gly Arg Gln Gly Asn Gln Val Phe Ile Ile Asp Phe Gly Leu
210 215 220

Ala Lys Glu Tyr Met Asp Pro Ala Thr Arg Arg His Ile Pro Tyr Arg
225 230 235 240

Asp Arg Lys Ser Phe Thr Gly Thr Ala Arg Tyr Ala Ser Arg Asn Gln
245 250 255

His Arg Gly Ile Glu His Ser Arg Arg Asp Asp Ile Glu Ser Leu Gly
260 265 270

Tyr Ile Leu Met Tyr Phe Leu Arg Gly Asn Leu Pro Trp Gln Gly Lys
275 280 285

Gly Gly Gln Arg Leu Thr Asp Gln Lys Gln His Glu Tyr Met His Asn
290 295 300

Lys Ile Lys Met Asn Thr Thr Val Glu Glu Leu Cys Asp Gly Tyr Pro
305 310 315 320

Ser Gln Phe Ala Asp Phe Leu His His Ala Arg Ser Leu Gly Phe Tyr
325 330 335

Glu Gln Pro Asp Tyr Cys Tyr Leu Arg Ser Leu Phe Arg Asp Leu Phe
340 345 350

Ile Gln Lys Lys Phe Gln Leu Asp His Val Tyr Asp Trp Thr Val Tyr
355 360 365

Thr Gln Leu Pro Gln Asn Gly Ser Leu Gln Ser Val Arg Ser Gln Asn
370 375 380

```
Ser Ala Ala Ser Ser His Leu Gln Asn Arg Pro Ser Asn Val Ser Tyr
385                 390                 395                 400

Cys Pro Pro Leu Thr Lys Ser Glu Phe Arg Arg Glu Val Val Ala Ala
                405                 410                 415

Asn
```

<210> 32
<211> 484
<212> PRT
<213> Physcomitrella patens

<400> 32

```
Met Glu Pro Arg Val Gly Asn Lys Tyr Arg Leu Gly Arg Lys Ile Gly
  1               5                  10                  15

Ser Gly Ser Phe Gly Glu Ile Tyr Leu Gly Thr Asn Val Gln Thr Asn
             20                  25                  30

Glu Glu Val Gly Ile Lys Leu Glu Ser Ile Lys Thr Lys His Pro Gln
         35                  40                  45

Leu Leu Tyr Glu Ser Lys Leu Tyr Arg Ile Leu Gln Gly Gly Thr Gly
     50                  55                  60

Ile Pro Asn Ile Arg Trp Phe Gly Ile Glu Gly Asp Tyr Asn Val Leu
 65                  70                  75                  80

Val Leu Asp Leu Leu Gly Pro Ser Leu Glu Asp Leu Phe Asn Phe Cys
                85                  90                  95

Ser Arg Lys Phe Ser Leu Lys Thr Val Leu Met Leu Ala Asp Gln Leu
            100                 105                 110

Ile Asn Arg Val Glu Tyr Val His Ala Lys Ser Phe Leu His Arg Asp
        115                 120                 125

Ile Lys Pro Asp Asn Phe Leu Met Gly Leu Gly Arg Arg Ala Asn Gln
    130                 135                 140

Val Tyr Ile Ile Asp Phe Gly Leu Ala Lys Lys Tyr Arg Asp Pro Ser
145                 150                 155                 160

Thr His Gln His Ile Pro Tyr Arg Glu Asn Lys Asn Leu Thr Gly Thr
                165                 170                 175

Ala Arg Tyr Ala Ser Ile Asn Thr His Leu Gly Ile Glu Gln Ser Arg
            180                 185                 190

Arg Asp Asp Leu Glu Ser Leu Gly Tyr Val Leu Met Tyr Phe Leu Arg
        195                 200                 205

Gly Ser Leu Pro Trp Gln Gly Leu Lys Ala Gly Thr Lys Lys Gln Lys
    210                 215                 220
```

Tyr Glu Lys Ile Ser Glu Lys Lys Met Ser Thr Pro Ile Glu Val Leu
225 230 235 240

Cys Lys Asn Tyr Pro Ser Glu Phe Ala Ser Tyr Phe His Tyr Cys Arg
245 250 255

Ser Leu Arg Phe Asp Asp Lys Pro Asp Tyr Ala Tyr Leu Lys Arg Ile
260 265 270

Phe Arg Asp Leu Phe Ile Arg Glu Gly Phe Gln Phe Asp Tyr Val Phe
275 280 285

Asp Trp Thr Ile Leu Lys Tyr Gln Gln Ser Gln Ile Ser Gly Gly Ser
290 295 300

Ser Thr Arg Leu Gly Ala Ser Ala Gly Gln Thr Ser Gly Ala Leu Gly
305 310 315 320

Thr Gly Ala Thr Gly Ser Arg Asp Leu Gln Arg Pro Thr Glu Pro Met
325 330 335

Asp Pro Ser Arg Arg Arg Leu Pro Gly Gly Ala Asn Gly Ser Gly Val
340 345 350

Ala Asn Ala Leu Asp Ser Ser Lys His Lys Ser Pro Gly Leu Asp Glu
355 360 365

Ser Ala Lys Asp Ser Ala Leu Ala Val Val Ser Glu Pro Glu Arg Met
370 375 380

His Thr Ser Ser Tyr Ala Thr Arg Gly Gly Ser Ser Ser Arg Arg Ala
385 390 395 400

Val Leu Ser Ser Ser Arg Pro Ser Gly Ala Ser Ala Glu Val Val Asp
405 410 415

Ser Ser Arg Thr Gly Ser Ser Lys Leu Gly Pro Thr Ser Leu Arg Ser
420 425 430

Ser Ala Gly Met Gln Arg Ser Ser Pro Val Thr Ser Asp Pro Lys Arg
435 440 445

Ile Ser Ser Arg His Pro Gln Pro Pro Ser Ala Asn Leu Arg Ile Tyr
450 455 460

Glu Ala Ala Ile Lys Gly Val Glu Ser Leu Ser Val Glu Val Asp Gln
465 470 475 480

Ser Arg Tyr Lys

<210> 33
<211> 333
<212> PRT
<213> Physcomitrella patens

<400> 33

Met Ser Lys Ala Arg Val Tyr Thr Asp Val Asn Val Gln Arg Pro Lys
1 5 10 15

Asp Tyr Trp Asp Tyr Glu Ala Leu Thr Val Gln Trp Gly Asp Gln Asp
20 25 30

Asp Tyr Glu Val Val Arg Lys Val Gly Arg Gly Lys Tyr Ser Glu Val
35 40 45

Phe Glu Gly Val Asn Ala Val Asn Ser Glu Arg Cys Val Met Lys Ile
50 55 60

Leu Lys Pro Val Lys Lys Lys Lys Ile Lys Arg Glu Ile Lys Ile Leu
65 70 75 80

Gln Asn Leu Cys Gly Gly Pro Asn Ile Val Lys Leu Leu Asp Ile Val
85 90 95

Arg Asp Gln Gln Ser Lys Thr Pro Ser Leu Ile Phe Glu Tyr Val Asn
100 105 110

Asn Thr Asp Phe Lys Val Leu Tyr Pro Thr Leu Thr Asp Phe Asp Ile
115 120 125

Arg Tyr Tyr Ile His Glu Leu Leu Lys Ala Leu Asp Tyr Cys His Ser
130 135 140

Gln Gly Ile Met His Arg Asp Val Lys Pro His Asn Val Met Ile Asp
145 150 155 160

His Glu Gln Arg Lys Leu Arg Leu Ile Asp Trp Gly Leu Ala Glu Phe
165 170 175

Tyr His Pro Gly Lys Glu Tyr Asn Val Arg Val Ala Ser Arg Tyr Phe
180 185 190

Lys Gly Pro Glu Leu Leu Val Asp Leu Gln Asp Tyr Asp Tyr Ser Leu
195 200 205

Asp Met Trp Ser Leu Gly Cys Met Phe Ala Gly Met Ile Phe Arg Lys
210 215 220

Glu Pro Phe Phe Tyr Gly His Asp Asn Tyr Asp Gln Leu Val Lys Ile
225 230 235 240

Ala Lys Val Leu Gly Thr Asp Glu Leu Asn Ser Tyr Leu Asn Lys Tyr
245 250 255

Arg Leu Glu Leu Asp Pro His Leu Glu Ala Leu Val Gly Arg His Ser
260 265 270

Arg Lys Pro Trp Ser Lys Phe Ile Asn Ala Asp Asn Gln Arg Leu Val
275 280 285

Val Pro Glu Ala Val Asp Phe Leu Asp Lys Leu Leu Arg Tyr Asp His
290 295 300

```
Gln Asp Arg Leu Thr Ala Lys Glu Ala Met Ala His Pro Tyr Phe Tyr
305                 310                 315                 320

Pro Val Lys Val Ser Glu Val Ser Asn Arg Arg Ser Ala
                325                 330
```

<210> 34
<211> 375
<212> PRT
<213> Physcomitrella patens

<400> 34

```
Met Glu Thr Ser Ser Gly Thr Pro Glu Leu Lys Val Ile Ser Thr Pro
  1               5                  10                  15

Thr Tyr Gly Gly His Tyr Val Lys Tyr Val Val Ala Gly Thr Asp Phe
             20                  25                  30

Glu Val Thr Ala Arg Tyr Lys Pro Pro Leu Arg Pro Ile Gly Arg Gly
         35                  40                  45

Ala Tyr Gly Ile Val Cys Ser Leu Phe Asp Thr Val Thr Gly Glu Glu
     50                  55                  60

Val Ala Val Lys Lys Ile Gly Asn Ala Phe Asp Asn Arg Ile Asp Ala
 65                  70                  75                  80

Lys Arg Thr Leu Arg Glu Ile Lys Leu Leu Arg His Met Asp His Glu
                85                  90                  95

Asn Val Val Ala Ile Thr Asp Ile Ile Arg Pro Pro Thr Arg Glu Asn
            100                 105                 110

Phe Asn Asp Val Tyr Ile Val Tyr Glu Leu Met Asp Thr Asp Leu His
        115                 120                 125

Gln Ile Ile Arg Ser Asn Gln Ala Leu Thr Glu Asp His Cys Gln Tyr
    130                 135                 140

Phe Leu Tyr Gln Ile Leu Arg Gly Leu Lys Tyr Ile His Ser Ala Asn
145                 150                 155                 160

Val Leu His Arg Asp Leu Lys Pro Thr Asn Leu Leu Val Asn Ala Asn
                165                 170                 175

Cys Asp Leu Lys Ile Ala Asp Phe Gly Leu Ala Arg Thr Leu Ser Glu
            180                 185                 190

Thr Asp Phe Met Thr Glu Tyr Val Val Thr Arg Trp Tyr Arg Ala Pro
        195                 200                 205

Glu Leu Leu Leu Asn Cys Ser Ala Tyr Thr Ala Ala Ile Asp Ile Trp
    210                 215                 220

Ser Val Gly Cys Ile Phe Met Glu Leu Leu Asn Arg Ser Ala Leu Phe
225                 230                 235                 240
```

```
Pro Gly Arg Asp Tyr Val His Gln Leu Arg Leu Ile Thr Glu Leu Ile
                245                 250                 255

Gly Thr Pro Glu Asp Arg Asp Leu Gly Phe Leu Arg Ser Asp Asn Ala
            260                 265                 270

Arg Arg Tyr Ile Lys His Leu Pro Arg Gln Ser Pro Ile Pro Leu Thr
        275                 280                 285

Gln Lys Phe Arg Gly Ile Asn Arg Ser Ala Leu Asp Leu Val Glu Lys
    290                 295                 300

Met Leu Val Phe Asp Pro Ala Lys Arg Ile Thr Val Glu Ala Ala Leu
305                 310                 315                 320

Ala His Pro Tyr Leu Ala Ser Leu His Asp Ile Asn Asp Glu Pro Ala
                325                 330                 335

Ser Val Ser Pro Phe Glu Phe Asp Phe Glu Glu Pro Pro Ile Ser Glu
            340                 345                 350

Glu His Ile Lys Asp Leu Ile Trp Arg Glu Ala Leu Asp Cys Ser Leu
        355                 360                 365

Gly Pro Asp Asp Met Val Gln
    370                 375


<210> 35
<211> 331
<212> PRT
<213> Physcomitrella patens

<400> 35
Met Gly Leu Thr Pro Phe Ser Cys Val Thr Val Gln Gly Tyr Val Arg
  1               5                  10                  15

Val Val Tyr Pro Asp Gly His Val Glu Asn Leu Ser Lys Ser Cys Ser
             20                  25                  30

Val His Asp Leu Leu Leu Gly Asn Pro Asp Tyr Tyr Val Cys Gly Ser
         35                  40                  45

Thr Pro Tyr Thr Ile Thr Asn Arg Met Ala Ala Glu Glu Val Leu Glu
     50                  55                  60

Tyr Gly Val Thr Tyr Phe Val Cys Ala Thr Pro Asn Ala Gln Pro Phe
 65                  70                  75                  80

Leu Glu Arg Gln Pro Lys Val Val His Arg Gly Ser Lys Ile Leu Pro
                 85                  90                  95

Arg Phe Ser Lys His Gly Val His Val Arg Glu Leu Arg Ser Pro Thr
            100                 105                 110

His Gly Ser Gln Gln Ser Arg Lys Val Phe Asp Tyr His Ser Val Thr
        115                 120                 125
```

```
Met Gln Gln Leu Glu Ser Ile Arg Asn Glu Gly Pro Glu Pro His Leu
    130                 135                 140

Ala Gly Asp Arg Pro Ser Lys His Leu Lys Leu Val Phe Ile Arg His
145                 150                 155                 160

Cys Leu Arg Ala Leu Arg Leu Pro Arg Ile Ser Ile Asp Leu Met Glu
                165                 170                 175

Ser Pro Leu Pro Asn Leu Ser Gly Glu Ala Leu Ser Pro Thr Ala Thr
            180                 185                 190

Ala Lys Asp Glu Ile Thr Gln Met Ile Leu Lys Ser Ala Ala Arg Ser
        195                 200                 205

Glu Leu Gly Met Tyr Val Ser Lys Arg Gln Glu Phe Tyr Leu Arg Arg
    210                 215                 220

Ala Arg Arg Arg Arg Lys Phe Ala Trp Lys Pro Val Leu Gln Ser Ile
225                 230                 235                 240

Ser Glu Met Lys Pro Val Met Glu Phe His Thr Pro Met Ala Tyr Arg
                245                 250                 255

Asp Ser Gly Ser Pro Pro Lys Asn Ala Ser Thr Pro Ser Leu Pro Gly
            260                 265                 270

Pro Lys Asn Ile Ser Pro Pro Arg Gln Val Ser Val Pro Gln Arg Ser
        275                 280                 285

Ser Pro Pro Pro Lys Asn Val Ser Pro Pro Pro Gln Pro Ala Phe Val
    290                 295                 300

Ala Arg Thr Ala Ser Lys Tyr Ser Ala Ala Ser Gln Gln Val Gln Arg
305                 310                 315                 320

Asn Arg Gly Asn Ala Lys Ser Leu Tyr Met Ala
                325                 330
```

<210> 36
<211> 346
<212> PRT
<213> Physcomitrella patens

```
<400> 36
Met Ser Arg Arg Val Arg Arg Gly Gly Leu Arg Val Ala Val Pro Lys
  1               5                  10                  15

Gln Glu Thr Pro Val Ser Lys Phe Leu Thr Ala Ser Gly Thr Phe Gln
             20                  25                  30

Asp Asp Asp Ile Lys Leu Asn His Thr Gly Leu Arg Val Val Ser Ser
         35                  40                  45

Glu Pro Asn Leu Pro Thr Gln Thr Gln Ser Ser Ser Pro Asp Gly Gln
     50                  55                  60
```

Leu Ser Ile Ala Asp Leu Glu Leu Val Arg Phe Leu Gly Lys Gly Ala
65 70 75 80

Gly Gly Thr Val Gln Leu Val Arg His Lys Trp Thr Asn Val Asn Tyr
85 90 95

Ala Leu Lys Ala Ile Gln Met Asn Ile Asn Glu Thr Val Arg Lys Gln
100 105 110

Ile Val Gln Glu Leu Lys Ile Asn Gln Val Thr His Gln Gln Cys Pro
115 120 125

Tyr Ile Val Glu Cys Phe His Ser Phe Tyr His Asn Gly Val Ile Ser
130 135 140

Met Ile Leu Glu Tyr Met Asp Arg Gly Ser Leu Ser Asp Ile Ile Lys
145 150 155 160

Gln Gln Lys Gln Ile Pro Glu Pro Tyr Leu Ala Val Ile Ala Ser Gln
165 170 175

Val Leu Lys Gly Leu Glu Tyr Leu His Gln Val Arg His Ile Ile His
180 185 190

Arg Asp Ile Lys Pro Ser Asn Leu Leu Ile Asn His Lys Gly Glu Val
195 200 205

Lys Ile Ser Asp Phe Gly Val Ser Ala Val Leu Val His Ser Leu Ala
210 215 220

Gln Arg Asp Thr Phe Val Gly Thr Cys Thr Tyr Met Ser Pro Glu Arg
225 230 235 240

Leu Gln Gly Arg Ser Tyr Ala Tyr Asp Ser Asp Leu Trp Ser Leu Gly
245 250 255

Leu Thr Leu Leu Glu Cys Ala Leu Gly Thr Phe Pro Tyr Lys Pro Ala
260 265 270

Gly Met Glu Glu Gly Trp Gln Asn Phe Phe Ile Leu Met Glu Cys Ile
275 280 285

Val Asn Gln Pro Pro Ala Ala Ala Ser Pro Asp Lys Phe Ser Pro Glu
290 295 300

Phe Cys Ser Phe Ile Glu Ser Cys Ile Arg Lys Cys Pro Ser Glu Arg
305 310 315 320

Pro Ser Thr Thr Asp Leu Leu Lys His Pro Phe Leu Gln Lys Tyr Asn
325 330 335

Glu Glu Glu Tyr His Leu Ser Lys Ile Leu
340 345

<210> 37
<211> 346
<212> PRT

<213> Physcomitrella patens

<400> 37

```
Met Ser Arg Arg Val Arg Arg Gly Gly Leu Arg Val Ala Val Pro Lys
 1               5                  10                  15

Gln Glu Thr Pro Val Ser Lys Phe Leu Thr Ala Ser Gly Thr Phe Gln
            20                  25                  30

Asp Asp Asp Ile Lys Leu Asn His Thr Gly Leu Arg Val Val Ser Ser
        35                  40                  45

Glu Pro Asn Leu Pro Thr Gln Thr Gln Ser Ser Ser Pro Asp Gly Gln
    50                  55                  60

Leu Ser Ile Ala Asp Leu Glu Leu Val Arg Phe Leu Gly Lys Gly Ala
65                  70                  75                  80

Gly Gly Thr Val Gln Leu Val Arg His Lys Trp Thr Asn Val Asn Tyr
                85                  90                  95

Ala Leu Lys Ala Ile Gln Met Asn Ile Asn Glu Thr Val Arg Lys Gln
            100                 105                 110

Ile Val Gln Glu Leu Lys Ile Asn Gln Val Thr His Gln Gln Cys Pro
        115                 120                 125

Tyr Ile Val Glu Cys Phe His Ser Phe Tyr His Asn Gly Val Ile Ser
    130                 135                 140

Met Ile Leu Glu Tyr Met Asp Arg Gly Ser Leu Ser Asp Ile Ile Lys
145                 150                 155                 160

Gln Gln Lys Gln Ile Pro Glu Pro Tyr Leu Ala Val Ile Ala Ser Gln
                165                 170                 175

Val Leu Lys Gly Leu Glu Tyr Leu His Gln Val Arg His Ile Ile His
            180                 185                 190

Arg Asp Ile Lys Pro Ser Asn Leu Leu Ile Asn His Lys Gly Glu Val
        195                 200                 205

Lys Ile Ser Asp Phe Gly Val Ser Ala Val Leu Val His Ser Leu Ala
    210                 215                 220

Gln Arg Asp Thr Phe Val Gly Thr Cys Thr Tyr Met Ser Pro Glu Arg
225                 230                 235                 240

Leu Gln Gly Arg Ser Tyr Ala Tyr Asp Ser Asp Leu Trp Ser Leu Gly
                245                 250                 255

Leu Thr Leu Leu Glu Cys Ala Leu Gly Thr Phe Pro Tyr Lys Pro Ala
            260                 265                 270

Gly Met Glu Glu Gly Trp Gln Asn Phe Phe Ile Leu Met Glu Cys Ile
        275                 280                 285
```

```
Val Asn Gln Pro Pro Ala Ala Ala Ser Pro Asp Lys Phe Ser Pro Glu
    290                 295                 300

Phe Cys Ser Phe Ile Glu Ser Cys Ile Arg Lys Cys Pro Ser Glu Arg
305                 310                 315                 320

Pro Ser Thr Thr Asp Leu Leu Lys His Pro Phe Leu Gln Lys Tyr Asn
                325                 330                 335

Glu Glu Glu Tyr His Leu Ser Lys Ile Leu
            340                 345
```

<210> 38
<211> 597
<212> PRT
<213> Physcomitrella patens

<400> 38

```
Met Gly Gln Cys Tyr Gly Lys Phe Asp Asp Gly Gly Glu Gly Glu Asp
  1               5                  10                  15

Leu Phe Glu Arg Gln Lys Val Gln Val Ser Arg Thr Pro Lys His Gly
             20                  25                  30

Ser Trp Ser Asn Ser Asn Arg Gly Ser Phe Asn Asn Gly Gly Gly Ala
         35                  40                  45

Ser Pro Met Arg Ala Lys Thr Ser Phe Gly Ser Ser His Pro Ser Pro
     50                  55                  60

Arg His Pro Ser Ala Ser Pro Leu Pro His Tyr Thr Ser Ser Pro Ala
 65                  70                  75                  80

Pro Ser Thr Pro Arg Arg Asn Ile Phe Lys Arg Pro Phe Pro Pro Pro
                85                  90                  95

Ser Pro Ala Lys His Ile Gln Ser Ser Leu Val Lys Arg His Gly Ala
            100                 105                 110

Lys Pro Lys Glu Gly Gly Ala Ile Pro Glu Ala Val Asp Gly Glu Lys
        115                 120                 125

Pro Leu Asp Lys His Phe Gly Tyr His Lys Asn Phe Ala Thr Lys Tyr
    130                 135                 140

Glu Leu Gly His Glu Val Gly Arg Gly His Phe Gly His Thr Cys Tyr
145                 150                 155                 160

Ala Lys Val Arg Lys Gly Glu His Lys Gly Gln Ala Val Ala Val Lys
                165                 170                 175

Ile Ile Ser Lys Ala Lys Met Thr Thr Ala Ile Ala Ile Glu Asp Val
            180                 185                 190

Gly Arg Glu Val Lys Ile Leu Lys Ala Leu Thr Gly His Gln Asn Leu
        195                 200                 205
```

Val Arg Phe Tyr Asp Ser Cys Glu Asp His Leu Asn Val Tyr Ile Val
210 215 220

Met Glu Leu Cys Glu Gly Gly Glu Leu Leu Asp Arg Ile Leu Ser Arg
225 230 235 240

Gly Gly Lys Tyr Ser Glu Glu Asp Ala Lys Val Val Val Arg Gln Ile
245 250 255

Leu Ser Val Val Ala Phe Cys His Leu Gln Gly Val Val His Arg Asp
260 265 270

Leu Lys Pro Glu Asn Phe Leu Phe Thr Thr Lys Asp Glu Tyr Ala Gln
275 280 285

Leu Lys Ala Ile Asp Phe Gly Leu Ser Asp Phe Ile Lys Pro Asp Glu
290 295 300

Arg Leu Asn Asp Ile Val Gly Ser Ala Tyr Tyr Val Ala Pro Glu Val
305 310 315 320

Leu His Arg Leu Tyr Ser Met Glu Ala Asp Val Trp Ser Ile Gly Val
325 330 335

Ile Thr Tyr Ile Leu Leu Cys Gly Ser Arg Pro Phe Trp Ala Arg Thr
340 345 350

Glu Ser Gly Ile Phe Arg Ala Val Leu Arg Ala Asp Pro Ser Phe Glu
355 360 365

Glu Ala Pro Trp Pro Ser Ile Ser Pro Glu Ala Lys Asp Phe Val Lys
370 375 380

Arg Leu Leu Asn Lys Asp Met Arg Lys Arg Met Thr Ala Ala Gln Ala
385 390 395 400

Leu Thr His Pro Trp Ile Arg Ser Asn Asn Val Lys Ile Pro Leu Asp
405 410 415

Ile Leu Val Tyr Arg Leu Val Arg Asn Tyr Leu Arg Ala Ser Ser Met
420 425 430

Arg Lys Ala Ala Leu Lys Ala Leu Ser Lys Thr Leu Thr Glu Asp Glu
435 440 445

Thr Phe Tyr Leu Arg Thr Gln Phe Met Leu Leu Glu Pro Ser Asn Asn
450 455 460

Gly Arg Val Thr Phe Glu Asn Phe Arg Gln Ala Leu Leu Lys Asn Ser
465 470 475 480

Thr Glu Ala Met Lys Glu Ser Arg Val Phe Glu Ile Leu Glu Ser Met
485 490 495

Asp Gly Leu His Phe Lys Lys Met Asp Phe Ser Glu Phe Cys Ala Ala
500 505 510

Ala Ile Ser Val Leu Gln Leu Glu Ala Thr Glu Arg Trp Glu Gln His
515 520 525

Ala Arg Ala Ala Tyr Asp Ile Phe Glu Lys Glu Gly Asn Arg Val Ile
530 535 540

Tyr Pro Asp Glu Leu Ala Lys Glu Met Gly Leu Ala Pro Asn Val Pro
545 550 555 560

Ala Gln Val Phe Leu Asp Trp Ile Arg Gln Ser Asp Gly Arg Leu Ser
565 570 575

Phe Thr Gly Phe Thr Lys Leu Leu His Gly Ile Ser Ser Arg Ala Ile
580 585 590

Lys Asn Leu Gln Gln
595

<210> 39
<211> 549
<212> PRT
<213> Physcomitrella patens

<400> 39
Met Gly Asn Thr Ser Ser Arg Gly Ser Arg Lys Ser Thr Arg Gln Val
1 5 10 15

Asn Gln Gly Val Gly Ser Gln Asp Thr Arg Glu Lys Asn Asp Ser Val
20 25 30

Asn Pro Lys Thr Arg Gln Gly Gly Ser Val Gly Ala Asn Asn Tyr Gly
35 40 45

Gly Lys Pro Ser Ser Gly Ala Gln Ala Gly Glu Arg Ser Thr Ser Ala
50 55 60

Pro Ala Ala Leu Pro Arg Pro Lys Pro Ala Ser Arg Ser Val Ser Gly
65 70 75 80

Val Leu Gly Lys Pro Leu Ser Asp Ile Arg Gln Ser Tyr Ile Leu Gly
85 90 95

Arg Glu Leu Gly Arg Gly Gln Phe Gly Val Thr Tyr Leu Cys Thr Asp
100 105 110

Lys Met Thr Asn Glu Ala Tyr Ala Cys Lys Ser Ile Ala Lys Arg Lys
115 120 125

Leu Thr Ser Lys Glu Asp Ile Glu Asp Val Lys Arg Glu Val Gln Ile
130 135 140

Met His His Leu Ser Gly Thr Pro Asn Ile Val Val Leu Lys Asp Val
145 150 155 160

Phe Glu Asp Lys His Ser Val His Leu Val Met Glu Leu Cys Ala Gly
165 170 175

```
Gly Glu Leu Phe Asp Arg Ile Ile Ala Lys Gly His Tyr Ser Glu Arg
            180                 185                 190

Ala Ala Ala Asp Met Cys Arg Val Ile Val Asn Val Val His Arg Cys
        195                 200                 205

His Ser Leu Gly Val Phe His Arg Asp Leu Lys Pro Glu Asn Phe Leu
    210                 215                 220

Leu Ala Ser Lys Ala Glu Asp Ala Pro Leu Lys Ala Thr Asp Phe Gly
225                 230                 235                 240

Leu Ser Thr Phe Phe Lys Pro Gly Asp Val Phe Gln Asp Ile Val Gly
                245                 250                 255

Ser Ala Tyr Tyr Val Ala Pro Glu Val Leu Lys Arg Ser Tyr Gly Pro
            260                 265                 270

Glu Ala Asp Val Trp Ser Ala Gly Val Ile Val Tyr Ile Leu Leu Cys
        275                 280                 285

Gly Val Pro Pro Phe Trp Ala Glu Thr Glu Gln Gly Ile Phe Asp Ala
    290                 295                 300

Val Leu Lys Gly His Ile Asp Phe Glu Asn Asp Pro Trp Pro Lys Ile
305                 310                 315                 320

Ser Asn Gly Ala Lys Asp Leu Val Arg Lys Met Leu Asn Pro Asn Val
                325                 330                 335

Lys Ile Arg Leu Thr Ala Gln Gln Val Leu Asn His Pro Trp Met Lys
            340                 345                 350

Glu Asp Gly Asp Ala Pro Asp Val Pro Leu Asp Asn Ala Val Leu Thr
        355                 360                 365

Arg Leu Lys Asn Phe Ser Ala Ala Asn Lys Met Lys Lys Leu Ala Leu
    370                 375                 380

Lys Val Ile Ala Glu Ser Leu Ser Glu Glu Glu Ile Val Gly Leu Arg
385                 390                 395                 400

Glu Met Phe Lys Ser Ile Asp Thr Asp Asn Ser Gly Thr Val Thr Phe
                405                 410                 415

Glu Glu Leu Lys Glu Gly Leu Leu Lys Gln Gly Ser Lys Leu Asn Glu
            420                 425                 430

Ser Asp Ile Arg Lys Leu Met Glu Ala Ala Asp Val Asp Gly Asn Gly
        435                 440                 445

Lys Ile Asp Phe Asn Glu Phe Ile Ser Ala Thr Met His Met Asn Lys
    450                 455                 460

Thr Glu Lys Glu Asp His Leu Trp Ala Ala Phe Met His Phe Asp Thr
465                 470                 475                 480
```

Asp Asn Ser Gly Tyr Ile Thr Ile Asp Glu Leu Gln Glu Ala Met Glu
485 490 495

Lys Asn Gly Met Gly Asp Pro Glu Thr Ile Gln Glu Ile Ile Ser Glu
500 505 510

Val Asp Thr Asp Asn Asp Gly Arg Ile Asp Tyr Asp Glu Phe Val Ala
515 520 525

Met Met Arg Lys Gly Asn Pro Gly Ala Glu Asn Gly Gly Thr Val Asn
530 535 540

Lys Pro Arg His Arg
545

<210> 40
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 40
caggaaacag ctatgacc 18

<210> 41
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 41
ctaaagggaa caaaagctg 19

<210> 42
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 42
tgtaaaacga cggccagt 18

<210> 43
<211> 25
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 43
ccacggtctt cggctgctgg tcgtg 25

<210> 44
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 44
gcagcacagc accaccagcg gctat 25

<210> 45
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 45
gcgcccagtg agtagctcca gcatt 25

<210> 46
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 46
atcccgggtg agtatcactt acggtggcga 30

<210> 47
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 47
gcgttaactc gaccaaggtc actattccaa gca 33

<210> 48
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 48
cggtgcccac ctcgttcctg tggtt 25

<210> 49
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 49
atcccgggag tgggtggttg gactgtaagg a 31

<210> 50
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 50
gcgttaacct tcgtcttgga caggtagagg ttac 34

<210> 51
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 51
gactcagccc cgtaatcctt caaca 25

<210> 52
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 52
atcccgggca acgagaagca ttcgagatgg c 31

<210> 53
<211> 33

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 53
gcgttaacga gcatcacgat actcggtgat ttc 33

<210> 54
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 54
cgacggctaa taccacgttg gcgacca 27

<210> 55
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 55
atcccgggct gtgatgtcgg tgtggtgctc tgc 33

<210> 56
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 56
gcgagctcgc accactgaat gatggagact cagg 34

<210> 57
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 57
cgaccgcagc ccatgaggaa gttat 25

<210> 58
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 58
atcccgggct cacgtagtgc actgaactct gtc 33

<210> 59
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 59
gcgttaacat gcccatcttc tcatactcag acc 33

<210> 60
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 60
ctcgcctacc aagccccatt agaaa 25

<210> 61
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 61
atcccgggtt gtcgaggacg gagagagaag ag 32

<210> 62
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 62
gcgttaacct taggaatcgt atggcagaga gct 33

<210> 63
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 63
gcttcacaat gttgggccct ccaca 25

<210> 64
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 64
gcgttaacgg gaggaaggtc gggggaagag acg 33

<210> 65
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 65
gcgagctcag cgcttcgcac aactgagaaa cct 33

<210> 66
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 66
acgagaaggt tggtgggctt caagt 25

<210> 67
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 67
atcccgggcg agccatggcg ccacttgctt 30

<210> 68
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 68
gcgttaacgc cgagcaacaa tgtctgctgg atg 33

<210> 69
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 69
cccggtaagc catcggagtg tggaa 25

<210> 70
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 70
atcccgggct tgtattggct cggataattt 30

<210> 71
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 71
gcgttaacgg caatatctgc acagccgttc act 33

<210> 72
<211> 25
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 72
gtgtctcgct gggccaagga atgaa 25

<210> 73
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 73
atcccgggcg gtcgagtcgt attaggtgtt gtttc 35

<210> 74
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 74
gagctccggt aggtccgacc tcttcaattg 30

<210> 75
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 75
gacgacgcga agcccggtgt ggttga 26

<210> 76
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 76
atcccgggag aggctgatct gatgctacag t 31

<210> 77
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 77
atgagctctg gcggattggc gaggtagttc gac 33

<210> 78
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 78
cggcgcaacg tagtatgcgc ttcca 25

<210> 79
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 79
cgcggtgaac aacaccttgc aggtgac 27

<210> 80
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 80
gctcgggtca gccctcaaca ccgca 25

<210> 81
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 81
gttaaagctt gtgcagcagt catgc 25

<210> 82
<211> 31

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 82
atcccgggtg taggcgggcg aggttcgatg c 31

<210> 83
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 83
gcgttaacga caaccggagt agaacggcag tcca 34

<210> 84
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 84
agaagcgagg aatgggcagg gacga 25

<210> 85
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 85
atcccgggcg aactgcgatc tgagattcca ac 32

<210> 86
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 86
gcgttaacga gatccaaccg aagccatcct acga 34

<210> 87
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 87
gcgctgcaga tttcatttgg agaggacacg 30

<210> 88
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 88
cgcggccggc ctcagaagaa ctcgtcaaga aggcg 35

<210> 89
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 89
gctgacacgc caagcctcgc tagtc 25

<210> 90
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 90
gcgttaactc gaccaaggtc actattccaa gca 33

<210> 91
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 91
gcgttaacct tcgtcttgga caggtagagg ttac 34

<210> 92
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 92
gcgttaacga gcatcacgat actcggtgat ttc 33

<210> 93
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 93
gcgagctcgc accactgaat gatggagact cagg 34

<210> 94
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 94
gcgttaacat gcccatcttc tcatactcag acc 33

<210> 95
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 95
gcgttaacct taggaatcgt atggcagaga gct 33

<210> 96
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 96
gcgagctcag cgcttcgcac aactgagaaa cct 33

<210> 97
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 97
gcgttaacgg caatatctgc acagccgttc act 33

<210> 98
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 98
gcgttaacgg caatatctgc acagccgttc act 33

<210> 99
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 99
gagctccggt aggtccgacc tcttcaattg 30

<210> 100
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 100
atgagctctg gcggattggc gaggtagttc gac 33

<210> 101
<211> 34
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 101
gcgttaacga caaccggagt agaacggcag tcca 34

<210> 102
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 102
gcgttaacga gatccaaccg aagccatcct acga 34

<210> 103
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 103
cccagtaata gcagggttgg aggaa 25

<210> 104
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 104
ggctgcctga agatccgcta cagag 25

<210> 105
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 105
cgtcaggcta ctttgcgtgg agcac 25

<210> 106
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 106
cggtgctggc taacaccagg ccaga 25

<210> 107
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 107
atcccgggca acgagaagca ttcgagatgg c 31

<210> 108
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 108
gcgttaacga gcatcacgat actcggtgat ttc 33

<210> 109
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 109
cgtggcatct ctcccgatgt tctta 25

<210> 110
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 110
ggccaactga aggcgtgtca tgatc 25

<210> 111
<211> 25

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 111
ctcgagggct cgttcaccgt gacct 25

<210> 112
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 112
cggaggtaac agtagtcagg ctgctc 26

<210> 113
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 113
ccgcgaccct tccacgcatc agcat 25

<210> 114
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 114
cctccaggaa gcctgcgccg agaag 25

<210> 115
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 115
ggacattgtc cgtgatcagc aatcga 26

<210> 116
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 116
cagcctctgg aacaaccaga cgctg 25

<210> 117
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 117
gtcaccgcga ggtacaagcc accac 25

<210> 118
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 118
gcagctctgg agctctgtac cacct 25

<210> 119
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 119
acggccacgt cgagaatctg agcaa 25

<210> 120
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 120
cgaagtgctc gcaagcaatg ccgaa 25

<210> 121
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 121
atcccgggcg gtcgagtcgt attaggtgtt gtttc 35

<210> 122
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 122
gagctccggt aggtccgacc tcttcaattg 30

<210> 123
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 123
gggcaactgt caatagcaga cctgga 26

<210> 124
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 124
gcaagtccca acgaacgtgt ctcgct 26

<210> 125
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 125
gcgaagatga cgactgctat tgcga 25

<210> 126
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 126
cgtgatgact ccaatgctcc atacg 25

<210> 127
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 127
gccagcatcg aggtcagtat ccggtgt 27

<210> 128
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 128
gtctgtggcc ttcagaggcg catcctc 27